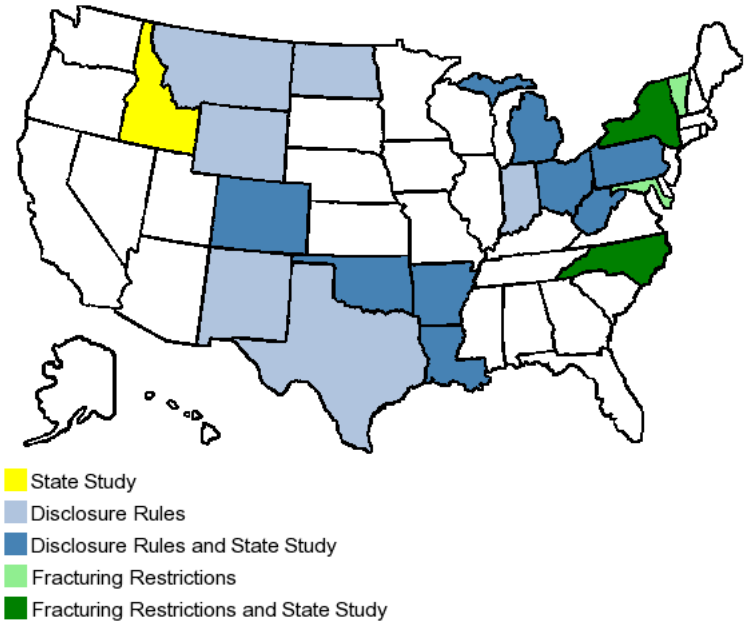
# Hydraulic Fracturing Chemical Disclosure Map




Shale Gas Production / Hydraulic Fracturing OverviewIn recent years, shale gas withdrawals in the United States more than quadrupled from 1,990 Bcf in 2007 to 8,500 billion cubic feet (Bcf) in 2011, and shale gas production is expected to continue to grow significantly over the next 20 years. The U.S. Energy Information Administration (EIA) estimates that shale gas production could account for almost half of all U.S. gas production by 2035.Shale gas refers to natural gas resources located in impermeable shale rock formations several thousand feet below the Earth's surface. Shale gas extraction involves drilling into shale ?plays', or areas in the formation with a high concentration of gas reserves, and it also uses different techniques than conventional natural gas production, including horizontal drilling and hydraulic fracturing. Through horizontal drilling, wells are initially drilled vertically and then horizontally to run throughout shale formations. Following the drilling, hydraulic fracturing (sometimes referred to as ?fracking?) involves injecting a mixture of sand, water, and chemicals to create small cracks in shale formations that enable easier natural gas extraction. Most of the 2 to 5 million gallons of fluid injected into a well are water, but the fluid used in hydraulic fracturing may also contain a variety of chemicals. These chemicals usually make up 0.5 to 2 percent of the overall volume of fluid used in hydraulic fracturing.Due to the growth of shale gas production in recent years, there has been momentum at the state level to further evaluate the long-term risks of shale gas production on human health and the environment. This map provides an overview of existing and potential shale gas production in the United States using EIA's most recent data (2011), as well as certain state-level actions that address concerns over hydraulic fracturing safety. These actions include requirements for shale gas producers to disclose the chemicals used in hydraulic fracturing, assessments of shale gas practices, and in some instances, moratoriums on hydraulic fracturing.Shale Gas ProductionMany U.S. states are expanding existing shale gas operations or gaining access to shale gas resources, including several states that are not traditionally considered energy producers. Operators are currently drilling new wells in several states, dramatically increasing shale gas production volumes. Note that shale gas production volumes are measured in Billion Cubic Feet (Bcf). In 2011, the United States consumed approximately 24,370 Bcf of natural gas. For comparison, a large natural gas fired power plant consumes about 7.3 Bcf of gas per year, which produces 730,000 megawatt-hours of electricity.Fracking Fluid Chemical Disclosure RequirementsTo improve transparency and to better assess the potential effects of hydraulic fracturing on drinking water resources and human health, several state governments have enacted requirements for shale gas producers to disclose the chemicals used in hydraulic fracturing fluids. Chemicals used in the process may be identified and reported using their unique Chemical Abstract Service (CAS) numbers. Depending on the state, disclosures must be made to a state agency or to an independent party, such as the Chemical Disclosure Registry (FracFocus.org), but rules may also include provisions for protecting trade secrets. The Chemical Disclosure Registry is managed by the Ground Water Protection Council (GWC) and Interstate Oil and Gas Compact Commission (IOGCC), two organizations that convene officials from multiple states to work on policies of common interest, such as hydraulic fracturing. The Chemical Disclosure Registry provides information on the location, dates, and chemicals involved with hydraulic fracturing activity.State-Sponsored Studies of Shale Gas Production PracticesSeveral states have sponsored studies of shale gas production practices within their states to better understand shale gas production potential and identify possible safety concerns. Several states have commissioned the State Review of Oil and Natural Gas Environmental Regulations (STRONGER) to conduct studies of state hydraulic fracturing policies and practices. STRONGER is a nonprofit organization that convenes stakeholders from state government, industry, and the environmental community to prepare its reports.State Restrictions on Hydraulic FracturingSeveral states have imposed restrictions on hydraulic fracturing. Most of these restrictions have been imposed temporarily, usually to give time for a state to study shale gas production practices. To date, only Vermont has indefinitely prohibited hydraulic fracturing.Additional Resources:C2ES: Natural Gas InitiativeC2ES Energy Portal: Natural Gas

## Alabama

Shale Gas Production
Hydraulic fracturing production has increased significantly in the state from1 Bcf in 2007 to 5 Bcf in 2010, extracted mainly from the Conasauga Formation in northeast Alabama.

Helpful Alabama links:
Overview of Permitting Systems in Seven Oil and Gas Producing States
Alabama State Oil and Gas Board

## Alaska

Shale Gas Production
Alaska has a considerable potential for shale gas extraction. According to a USGS analysis, the mean estimate of shale gas recoverable with current technology in Alaska is 42 trillion cubic feet.

Helpful Alaska link:
Alaska Department of Oil and Gas Conservation Commission

## Arizona

Shale Gas Production
Arizona produced less than 1 Bcf of natural gas in 2010, none of which was from shale reserves. As of April 2012, only ten wells have been hydraulically fractured in Arizona, all of which were drilled to extract carbon dioxide gas, not natural gas.

Helpful Arizona link:
Arizona Department of State Code
Arizona Geological Survey - Oil and Gas Conservation Commission

## Arkansas

Shale Gas Production
Shale gas production in the state has risen dramatically from84 Bcf in 2007 to 935 Bcf in 2011, mostly due to increased access to the Fayetteville Shale Play.

Fracking Fluid Chemical Disclosure Rules
Effective as of January 15, 2011, the Arkansas Oil & Gas Commission (AOGC) requires operators to disclose the product name, concentration, and Chemical Abstract Service (CAS) numbers of all chemicals used in hydraulic fracturing after the completion of fracturing activities. Before hydraulic fracturing occurs, operators are required to disclose a list of additives and CAS numbers of each ingredient in the fracture fluid. Chemical concentrations must be submitted within 30 days of fracturing completion. Trade secrets may be withheld from the state upon request, but the chemical families must be provided when identities are withheld.

Final Rules: Rule B-19 sets requirements for hydraulically fractured wells within the state. This rule was written into the Arkansas Oil & Gas Commission General Rules and Regulations

State-Sponsored Study
With support from the Arkansas Oil and Gas Commission (AOGC), an Arkansas Hydraulic Fracturing State Review was completed in February 2012.

Helpful Arkansas link:
Overview of Permitting Systems in Seven Oil and Gas Producing States

## California

Shale Gas Production
California produces shale gas from plays in the Monterey, Santa Maria, Ventura, and Los Angeles Basins, along with offshore areas. The state has yielded between 90 Bcf and 130 Bcf per year from 2007 to 2011.

Fracking Fluid Chemical Disclosure Rules
No bills that include chemical disclosure have been passed by the California legislature, and the state has not yet adopted regulations regarding chemical disclosure. Hydraulic fracturing laws have been debated recently in the legislature.

Helpful California links:
California Energy Commission 2012 Natural Gas Market Trends Report
California Administrative Code

## Colorado

Shale Gas Production
Colorado lies over several shale plays, the largest being the Denver Basin, which covers most of the state's eastern

plains. Shale gas production grew from 138 Bcf in 2007 to 211 Bcf in 2011.

Fracking Fluid Chemical Disclosure Rules
On December 13, 2011, the Colorado Oil and Gas Conservation Commission issued Order 1R-114, which requires the disclosure of the product names, concentrations, chemicals used, and the Chemical Abstract Service (CAS) numbers. The rule does not require companies to report on how hydraulic fracturing chemicals are combined in the extractive process. Companies must disclose the chemicals used in hydraulic fracturing to the Chemical Disclosure Registry (FracFocus.org) within sixty days of completing hydraulic fracturing activity. Trade secrets will remain protected by federal and state laws, but regulators and health care professionals may request confidential information about hydraulic fracturing chemicals, and a company must file an affidavit that its confidential information meets the legal definition of a trade secret.

Final Rule: Order NO. 1R-114

State-Sponsored Study
With support from the Colorado Oil and Gas Conservation Commission (COGCC), a Colorado Hydraulic Fracturing State Review was completed in October 2011.

## Connecticut

Little to no shale gas production.

## Florida

Little to no shale gas production.

## Georgia

Little to no shale gas production.

## Hawaii

Little to no shale gas production.

## Idaho

Idaho currently has little to no shale gas production.

Fracking Fluid Chemical Disclosure Rules
Effective March 23, 2012, the state implemented rules that would require chemical disclosure when submitting a permit application to drill, along with disclosure in a post-treatment report to be filed within 30 days after fracturing completion. Chemical additives, concentrations, Chemical Abstract Numbers, and chemical concentrations must be disclosed to the state. Trade secrets are protected by federal and state law except when disclosure is required to health professionals.

Final Rule:
H.B. 464 and H.B. 463 update rules and regulations related to drilling

Helpful Idaho links:
Idaho Statutes
Resources & Environment Committee 2012 Legislative Session

## Illinois

Shale Gas Production
Illinois is not traditionally a natural gas-producing state, but has high shale gas production potential, due to the large geographic area of the shale-rich Illinois basin, where USGS estimates 4.65 trillion cubic feet of natural gas are available.

Fracking Fluid Chemical Disclosure Rules
No bills adopting chemical disclosure requirements have been passed in Illinois legislature to date, but hydraulic fracturing laws have been debated recently in the legislature.

Helpful Illinois Link:
Department of Natural Resources Oil and Gas Division

## Indiana

Indiana currently has little to no shale gas production.

Fracking Fluid Chemical Disclosure Rules
Temporary rules governing hydraulic fracturing operations, including chemical disclosure, conducted by oil and gas

operators in Indiana came into effect on July 1, 2012. The rules require that the proposed concentrations of chemicals in the hydraulic fracturing fluid be disclosed. After fracturing completion, with the completion report, the product names, concentration of each additive and source of base fluid are required to be disclosed. There are no state-level trade secret protections defined in the emergency rule.

Final Rule:
The Natural Resources Commission Emergency Rules resulted from the passage of H.B. 1107 (2012), a law that adopted rules related to the reporting and disclosure of hydraulic fracturing fluids.

Helpful Indiana link:
Department of Natural Resources Press Release

## Iowa

Little to no shale gas production.

## Kansas

Little to no shale gas production.

## Kentucky

Shale Gas Production
Kentucky yielded between 2-5 Bcf of shale gas per year between 2007 and 2010.

Helpful Kentucky links:
Energy and Environment Cabinet

## Louisiana

Shale Gas Production
Louisiana produces a large quantity of both conventional and shale gas in the United States due to expanded access of the Haynesville-Bossier Shale Play. Hydraulic fracturing has grown dramatically in the state, extracting over 2,088 Bcf in 2011 compared to less than 15 Bcf in 2007.

Fracking Fluid Chemical Disclosure Rules
On October 20, 2011, the Louisiana Department of Natural Resources (DNR) Office of Conservation adopted final hydraulic fracturing disclosure rules (Title 43 of the Louisiana Revised Statutes, under Subpart 1, Statewide Order No. 29-B). These rules require the disclosure of all fluids used in hydraulic fracturing that are subject to federal Occupational Safety and Health Administration (OSHA) Hazard Communication requirements (29 CFR 1910.1200) and are not considered to be trade secrets. Operators must file for exemptions for chemicals that they consider trade secrets. The state also requires Chemical Abstract Service (CAS) numbers and chemical concentrations to be reported to the Office of Conservation or the Chemical Disclosure Registry (FracFocus.org) within 20 days following the completion of a well. Final Rule: Executive Orders from 2011 (p. 3064) outline the Rules for hydraulic fracturing operations within the state and amended the the Louisiana Administrative Code for Natural Resources.

State-Sponsored Study
With support from the Louisiana Department of Natural Resources, the the Louisiana Hydraulic Fracturing State Review was completed in March 2011.

## Maine

Little to no shale gas production.

## Maryland

Shale Gas Production
Maryland has shale gas production potential due to its proximity to the Marcellus Shale Play.

Restrictions on Hydraulic Fracturing/State-Sponsored Study
In June 2011, Governor Martin O'Malley issued Executive order 01.01.2011.11, stating that no hydraulic fracturing may take place until a three year study of impacts is completed. This order created Maryland's Marcellus Shale Safe Drilling Initiative to study the potential effects of hydraulic fracturing in the state.

Final Rule: Executive order 01.01.2011.11

Helpful Maryland link: Maryland Shale Safe Drinking Initiative

## Massachusetts

Little to no shale gas production.

## Michigan

Shale Gas Production
Suppliers in Michigan have a long history of natural gas production from drilling over 12,000 hydraulically fractured wells, mainly into the Antrim Shale Formation. Hence, shale gas production yielded between 113 Bcf and 136 Bcf per year from 2007 to 2011.

Fracking Fluid Chemical Disclosure Rules
The state has issued permitting instructions for drillers, which are required to disclose chemicals used in hydraulic fracturing within 60 days after the well completion to the Department of Environmental Quality, though the exact concentration of chemicals is not required. Companies are not required to report chemicals that are considered trade secrets, even to health care professionals.

State-Sponsored Study
In April 2012, the Michigan House of Representatives' Subcommittee on Natural Gas put out a report on potential natural gas production in the state.

Final Rule: Michigan DEQ Permitting Instructions (May 2011)

## Minnesota

Little to no shale gas production.

## Mississippi

Shale Gas Production
Mississippi produces a moderate quantity of natural gas, but limited production from shale gas. Studies have begun within the Tuscaloosa Shale formation to identify potential shale gas production sites.

Helpful Mississippi Link:
Mississippi State Oil and Gas Board Rules and Regulations

## Missouri

Little to no shale gas production.

## Montana

Shale Gas Production
Shale gas production is centered on the Bakken Formation, and shale gas production has stayed relatively constant from 2007 to 2011, producing around 14 Bcf.

Fracking Fluid Disclosure Rules
On August 26, 2011, the Montana Board of Oil and Gas issued a final rule (36.22.1015) requiring companies to report the names of all chemicals used in hydraulic fracturing. Companies must make disclosures of the chemical's product family (but not the exact name of the chemical) along with Chemical Abstract Service (CAS) numbers and chemical concentrations to the Montana Board of Oil and Gas or on the Chemical Disclosure Registry (FracFocus.org). Trade secrets are protected, only with exceptions in the cases of medical emergencies and spills as required for federal disclosure.

Final Rule: Rule 36.22.1015
Montana DNRC Rules summary

Helpful Montana Links:
Overview of Permitting Systems in Seven Oil and Gas Producing States
Montana Board of Oil & Gas Conservation Underground Injection Control Rules

## Nebraska

Little to no shale gas production.

## Nevada

Little to no shale gas production.

## New Hampshire

Little to no shale gas production.

## New Jersey

Shale Gas Production
New Jersey is not currently a producer of natural gas, but lies on the Utica Shale formation.

Restrictions on Hydraulic Fracturing
In August 2011, Governor Chris Christie vetoed S-2576, a bill passed by the state legislature to prohibit hydraulic fracturing indefinitely, and issued a moratorium on hydraulic fracturing while the N.J. Department of Environmental Protection evaluated hydraulic fracturing's potential environmental impact. The moratorium ended in January 2013.

Helpful New Jersey Link:
Governor Christie's press release regarding the hydraulic fracturing moratorium

## New Mexico

Shale Gas Production
Shale production within New Mexico and has expanded moderately from 54 Bcf in 2007 to 93 Bcf in 2010.

Fracking Fluid Chemical Disclosure Rules
Effective February 15, 2012, the New Mexico Energy, Minerals, and Natural Resources Department requires hydraulic fracturing operators to complete a Hydraulic Fracturing Fluid Disclosure Form within 45 days of well completion. The total volume of fluid, trade names, Chemical Abstract Service (CAS) numbers, and concentrations must be disclosed to the Department. If a company considers an ingredient to be a trade secret, it may keep the chemical's name and concentration undisclosed.

Final Rule: Natural Resources and Wildlife Code

## New York

Shale Gas Production
New York has shale gas production potential, holding an estimated 163-313 trillion cubic feet of shale gas reserves.

Restrictions on Hydraulic Fracturing
In 2010, Governor Paterson issued Executive Order 41, which continued the state's existing de facto moratorium on drilling by requiring a Supplemental Generic Environmental Impact Statement (SGEIS).

State-Sponsored Study
In July 2011, the New York Department of Environmental Conservation (DEC) launched a Hydraulic Fracturing Advisory Panel, tasked with estimating the costs of hydraulic fracturing to the state.

Final Rule: Regulations under consideration

Helpful NY links:
News Article
Overview of Permitting Systems in Seven Oil and Gas Producing States

## North Carolina

North Carolina produces little to no shale gas.

Restrictions on Hydraulic Fracturing
In May 2012, Governor Perdue issued an order to develop hydraulic fracturing rules and to create a work group to produce guidelines for shale gas production in North Carolina while exploration and drilling regulations were being considered in the general assembly. A ban on horizontal drilling was imposed in 1945. In July 2012, the passage of S.B. 820 (over Governor Perdue's veto) legalized horizontal gas drilling.

State-Sponsored Study
The Oil and Gas Conservation Act, revised in the summer of 2012, created an Energy and Mining Commission that will conduct studies and create new regulations to govern natural gas production through horizontal drilling. The commission is scheduled to complete its work by October 2014.

With support from the North Carolina Department of Environment and Natural Resources (DENR), the North Carolina State Review was completed in February 2012.

Final Rule: S.B. 820

Helpful North Carolina link: News Article

## North Dakota

Shale Gas Production

North Dakota's shale gas production has grown very rapidly from 7 Bcf in 2007 to 115 Bcf in 2011.

Fracking Fluid Chemical Disclosure Rules
Effective April 1, 2012, the North Dakota Department of Mineral Resources Oil and Gas Division requires hydraulic fracturing operators to disclose product names, purpose, Chemical Abstract Service (CAS) numbers, and chemical concentrations within 60 days of the completion of hydraulic fracturing. If a company considers an ingredient to be a trade secret, it may keep the chemical's name and concentration undisclosed.

Final Rule: North Dakota Code

Helpful North Dakota links:
Department of Mineral Resources Slides
Rule Press Release

## Ohio

Shale Gas Production
Shale gas production opportunities have been discovered within the Utica Shale Play and Appalachian Basin and according to the Ohio Geological Survey, more than 15 trillion cubic feet of natural gas could be available. More than 3 million acres in Ohio's Utica Shale formation have already been leased for drilling and the state produced 2 Bcf in 2011 compared to negligible amounts up to that year.

Fracking Fluid Chemical Disclosure Rules
On June 11, 2012, Governor John Kasich signed S.B. 315, which expands the state's current disclosure requirements. S.B. 315 created the nation's first combined well construction and hydraulic fracturing chemical disclosure requirement. Companies must disclose the product names, Chemical Abstract Service (CAS) numbers, and chemical concentrations used in hydraulic fracturing on the Chemical Disclosure Registry (FracFocus.org) within 60 days after the end of drilling. S.B. 315 also requires well operators to disclose the proposed source of water used in the well drilling and hydraulic fracturing process. Operators must disclose a range of chemical concentrations used in the fracking fluids, but not the exact chemical concentrations. If requested by a company, trade secret information may be withheld except in medical emergencies and spills.

State-Sponsored Study
With support from the Ohio Department of Natural Resources, a Hydraulic Fracturing State Review was completed in January, 2011.

Final Rule: S.B. 315

Helpful Ohio links: Summary of S.B. 315
Overview of Permitting Systems in Seven Oil and Gas Producing States

## Oklahoma

Shale Gas Production
Shale gas production increased more than five-fold from 2007 to 2011, rising from 83 Bcf to 449 Bcf. The Woodford Shale in central Oklahoma is the largest play in the state.

Fracking Fluid Chemical Disclosure Rules
In May 2012, the Oklahoma Corporation Commission issued rules, effective January 1, 2013, for disclosing chemicals used in hydraulic fracturing. Producers must disclose the chemicals used in hydraulic fracturing fluids on the Chemical Disclosure Registry (FracFocus.org) or directly to the Oklahoma Corporation Commission, however companies may request to withhold trade secrets. Disclosures include the total volume and type of base fluid, CAS numbers, and concentrations. Disclosures must be made within 60 days after the conclusion of a well's hydraulic fracturing operations.

Final Rule: OAC 165:10-3-10(b) includes chemical disclosure rules.

State-Sponsored Study
With support from the Oklahoma Corporation Commission, a Hydraulic Fracturing State Review was completed in January 2011.

## Oregon

Little to no shale gas production.

## Pennsylvania

Shale Gas Production
Due to production from the Marcellus Shale play, shale gas production rose within the state to 1,068 Bcf in 2011

compared to less than 1 Bcf in 2007.

Fracking Fluid Chemical Disclosure Rules
On February 14, 2012, Governor Tom Corbett approved H.B. 1950, which requires the disclosure of all chemicals and concentrations used in the hydraulic fracturing within 60 days after fracturing. Chemical Abstract Service (CAS) numbers are required only for chemicals that are considered dangerous and producers must disclose chemicals on Material Safety Data Sheets. Trade secrets are protected, but the operators must disclose the chemical family of withheld chemicals when a trade secret claim is made.

State-Sponsored Study
With support from the Pennsylvania Department of Environmental Protection, a Hydraulic Fracturing State Review was completed in September 2010.

Final Rule: H.B. 1950

Helpful Pennsylvania links:
Pennsylvania Department of Environmental Protection
Overview of Permitting Systems in Seven Oil and Gas Producing States

## Rhode Island

Little to no shale gas production.

## South Carolina

Little to no shale gas production.

## South Dakota

Shale Gas Production
South Dakota produces a moderate quantity of natural gas, but limited production from shale gas. Studies have been proposed to evaluate the potential impacts of hydraulic fracturing within the state.

Helpful South Dakota Link:
Department of Environment and Natural Resources

## Tennessee

Little to no shale gas production.

## Texas

Shale Gas Production
Texas is by far the largest natural gas producing state in the United States due to numerous conventional and shale plays. Shale gas production has increased in the state, yielding over 3,000 Bcf in 2011 compared to 1,264 Bcf in 2007.

Fracking Fluid Chemical Disclosure Rules
On May 29, 2011, the Texas Legislature passed H.B. No. 3328, which required the Railroad Commission of Texas to promulgate rules requiring the disclosure of the composition of fluids used in hydraulic fracturing. On January 2, 2012, the Railroad Commission of Texas adopted Title 16, Part 1, Chapter 3, Rule §3.29, requiring companies to report the names of chemicals and total water volume used in hydraulic fracturing, effective February 1, 2012. The concentrations of chemicals used in hydraulic fracturing must be reported if they are subject to the Code of Federal Regulations (29 CFR 1910.1200 - Toxic and Hazardous Substances). Companies must disclose chemicals used in hydraulic fracturing on the Chemical Disclosure Registry (FracFocus.org) when the well completion report is due. Trade secrets will remain protected by federal and state laws, but regulators and health care professionals may request confidential information about hydraulic fracturing chemicals for emergency planning.

Final Rules:
Texas Administrative Code

Helpful Texas links: Overview of Permitting Systems in Seven Oil and Gas Producing States
Title 16, Part 1, Chapter 3 (Economic Regulation -Railroad Commission of Texas - Oil and Gas Division)

## Utah

Little to no shale gas production.

## Vermont

Vermont currently produces little to no shale gas.

Restrictions on Hydraulic Fracturing
In May of 2012, Governor Peter Shumlin signed Bill H.464, making Vermont the first state in the United States to ban hydraulic fracturing indefinitely.

## Virginia

Little to no shale gas production.

## Washington

Little to no shale gas production.

## West Virginia

Shale Gas Production
Starting in 2009, shale gas production ramped up in West Virginia, especially in the Marcellus Shale Reserves. The state yielded 40 Bcf in 2007 compared to 227 Bcf in 2011.

Fracking Fluid Chemical Disclosure Rules
H.B. 401 was signed into law in December 2011. The law regulates shale gas development and hydraulic fracturing, including the disclosure of fluid additives and Chemical Abstract Numbers. No process has been established to evaluate trade secrets under state law, but federal trade secret laws still apply to operators within West Virginia. State code 22-6-22(d) states that a well report could be kept confidential, upon written request, if the report would reveal trade secrets.

Final Rules: H.B. 401
West Virginia DEP Emergency Regulations (August 2011)

State-Sponsored Study
The West Virginia Department of Environmental Protection (DEP) is providing rulemaking and study on hydraulic fracturing. The first of several reports on this subject is due on January 1, 2013.

Helpful West Virginia link:
Overview of H.B. 401

## Wisconsin

Little to no shale gas production.

## Wyoming

Shale Gas Production
Wyoming is the second largest natural gas producing state in the United States, and has shale gas production opportunities located within the Niobrara Shale Play. The state's production increased from 3.8 Bcf in 2007 to 4.7 Bcf in 2011.

Fracking Fluid Disclosure Rules
On August 26, 2010, Governor Dave Freudenthal approved rules proposed by the Wyoming Oil and Gas Conservation Commission (WOGCC) that require hydraulic fracturing operators to disclose the names, chemical concentrations, and Chemical Abstract Service (CAS) numbers to WOGCC. If a claim is made to the state agency, trade secrets may be protected to the extent of the open records laws. Operators must disclose the proposed chemical concentrations used to apply for a drilling permit.

WOGCC Final Rule:
Wyoming Oil and Gas Regulation, Ch. 3, Section 45 (September 2010).

Helpful Wyoming link:
Groundwork Link