

The Evolving Regulatory Landscape of Shale Gas Development

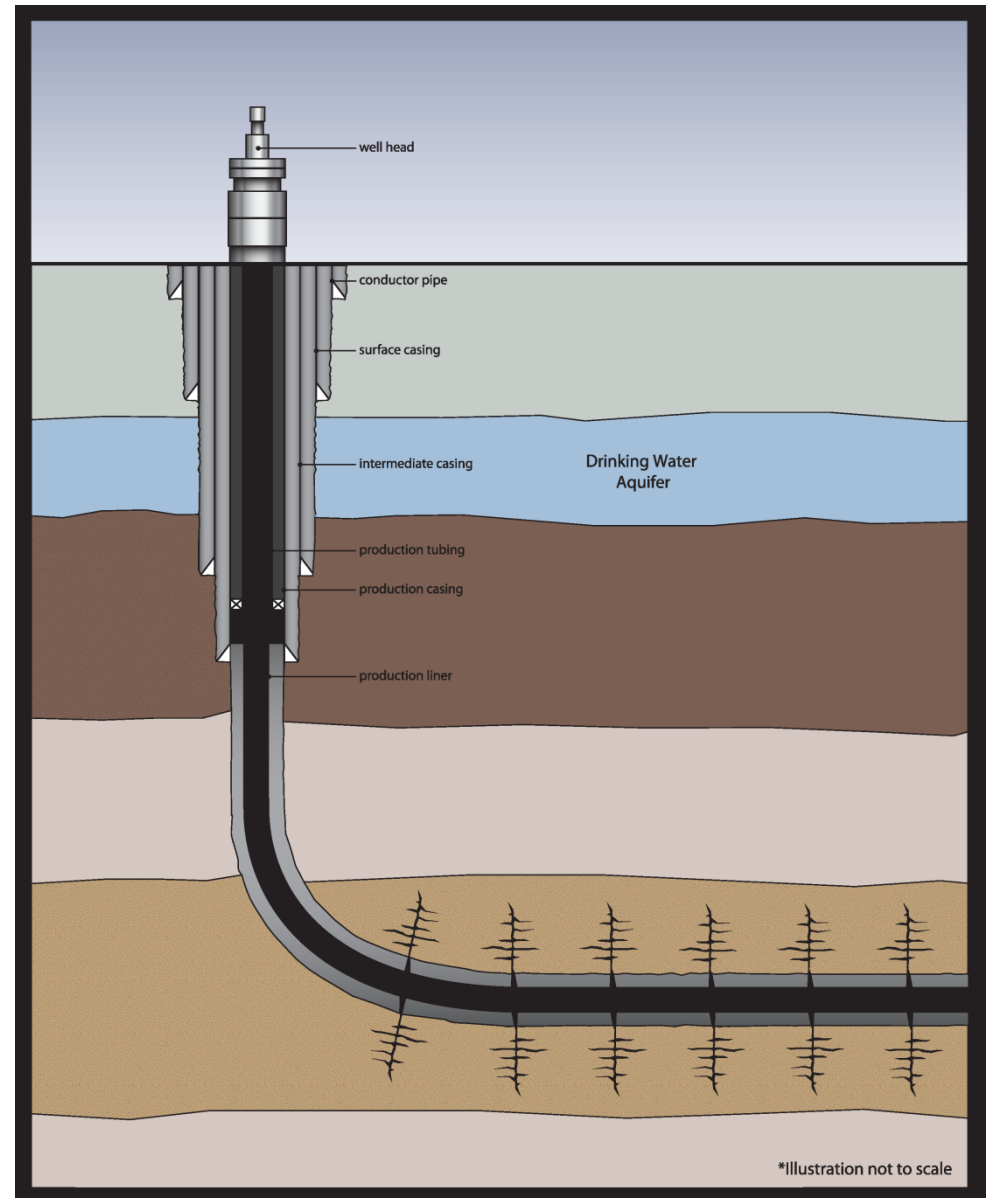
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Shale Gas and Hydraulic Fracturing – “Fracking”

- The hydraulic fracturing treatment is only one of many steps in shale gas development.
- It is unlikely that fracking is the step posing the greatest environmental risk.
- Other steps with risk:
 - Drilling
 - Well casing and completion
 - Flowback and produced water management
 - Gas transportation
 - Surface development activities (road building, traffic, pad construction, etc)



Environmental Risks and Regulatory Strategies

Risk/Impact	Possible Risk Pathways	Major Regulatory Strategies
Water Quality	<ul style="list-style-type: none"> Leakage of hydraulic fracturing fluid or flowback water through or around the well bore casing to shallow groundwater Leakage of hydraulic fracturing fluid from shale formation to shallow groundwater Accidental spilling of hydraulic fracturing fluid or flowback water to surface water Intentional dumping of hydraulic fracturing fluid or flowback water to surface water 	<ul style="list-style-type: none"> Well construction standards, including wellbore integrity testing and certification Hydraulic fracturing fluid chemical constituent disclosure Pre-development (baseline) groundwater testing Response plan for reported events Ban or moratorium on shale gas development Total Dissolved Solid (TDS) concentration limits for surface-disposed effluents
Air Quality	<ul style="list-style-type: none"> Volatile Organic Compounds (VOCs) escaping from the wellhead during well completion and from condensate storage tanks 	<ul style="list-style-type: none"> Reduced-emission (“Green”) well completions
Induced Seismicity	<ul style="list-style-type: none"> Disposal of used hydraulic fracturing fluids in deep injection wells either at too high a pressure or to near an existing geologic fault 	<ul style="list-style-type: none"> Limit injection pressures Restrict permits to areas of sufficient geologic knowledge
Stray Gas Migration	<ul style="list-style-type: none"> Leakage of methane through or around the well bore casing to shallow groundwater Leakage of methane from shale formation to shallow groundwater 	<ul style="list-style-type: none"> Well construction standards, including wellbore integrity testing and certification Response plan for reported events
Community Impacts (Noise, Traffic, Property Value, etc)	<ul style="list-style-type: none"> Placement of shale gas development infrastructure and movement of equipment in areas not agreed upon by local residents 	<ul style="list-style-type: none"> Ban or moratorium on shale gas development Conditional use zoning

Federal Regulation: Air and Water (EPA)

■ Air

- EPA released new source performance standards and national emissions standards for hazardous air pollutants in the oil and natural gas sector on April 17, 2012
- First Federal air standards for hydraulically fractured gas wells require:
 - Reduced emission (“green”) completions or flaring for wells developed prior to January 1, 2015
 - Green completions only on wells developed in 2015 and after
- Expected to reduce volatile organic compound (VOC) emissions from applicable wells by 95%

■ Water

- Energy Policy Act (EPAct) of 2005 excludes underground injection of any fluid pursuant to hydraulic fracturing operations, other than diesel fuels, from EPA’s regulatory authority under the Safe Drinking Water Act
- EPA retains authority to regulate surface water pollution, and has imposed penalties on companies such as Chesapeake for stream disturbance
- EPA is attempting to exercise authority under the Toxic Substances Control Act to issue a rulemaking requiring disclosure of chemical constituents of fracking fluid



Federal Regulation: Development on Federal Lands (BLM)

- Bureau of Land Management (BLM) and other land management agencies have some authority over shale gas development on lands for which they are responsible
- BLM has issued draft rules for shale gas development on public lands, which require (in part):
 - Disclosure of chemical constituents of fracking fluids
 - Submission of an operation plan for BLM evaluation prior to hydraulic fracturing operations including plans for:
 - Groundwater protection
 - Anticipated surface disturbance
 - Management and disposal of recovered fluids
 - Self-certification that fracking fluids comply with all applicable laws
 - Information to confirm wellbore integrity before, during, and after hydraulic fracturing
 - Post-fracking report including specific chemical makeup of fracturing fluid

State Regulation: Air

- Regulation of air emission is dominated by EPA
- Wyoming and Colorado require green completions
- Colorado also regulates VOC emissions from condensate tanks, including reporting and reductions for ozone non-attainment areas



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State Regulation: Water

- Water regulation occurs primarily at the state level
- State regulations for shale gas development vary, but where they exist, they focus on **disclosure** of fracturing fluid chemical constituents
 - Often, but not always, through FracFocus.org
 - Sometimes requires chemical identification numbers, sometimes generic names, sometimes concentrations in fluid, etc
 - Protections for proprietary or “trade secret” information;
 - Few require justification
 - Some require full disclosure to medical personnel in emergencies
- Water regulation can also include disposal methods
 - Pennsylvania effectively outlaws discharging effluent to surface water by setting effluent limits on total dissolved solids (TDS) that flowback brines cannot meet
 - Ohio allows surface disposal for ice and dust control on roads
- Some states also regulate wellbore integrity (Pennsylvania)



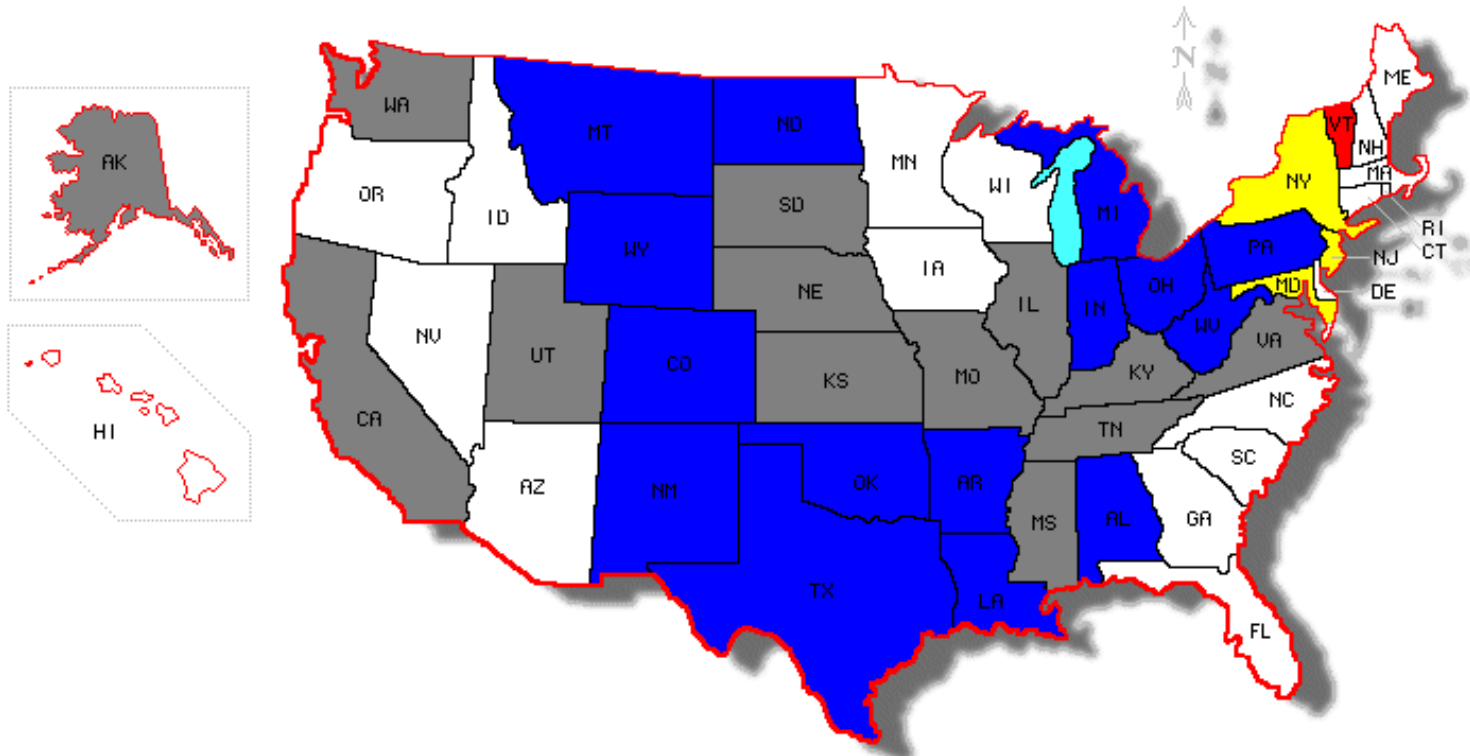
State Regulation: Selected Water Protection Requirements

	Baseline Water Quality Analysis	Pre-Hydraulic Fracturing Chemical Disclosure	Post-Hydraulic Fracturing Chemical Disclosure	All Chemicals Identified (not just hazardous)	Concentration of All Chemicals (Actual or Maximum)	Emergency Healthcare Access to Trade Secrets
Alabama			X			
Arkansas		X	X	X		X
Colorado			X	X	X	X
Indiana		X	X			
Louisiana			X			
Michigan			X			
Montana		X	X	X	X	X
N. Dakota			X			
New Mexico			X			
Ohio	X		X	X	X	X
Oklahoma*			X	X	X	
Pennsylvania			X	X	X	X
Texas			X	X		X
W. Virginia		X	X			
Wyoming		X	X	X	X	

*Oklahoma's disclosure laws do not begin to take effect until 2013 at the earliest

Source: McFeeley, 2012, Adapted from Neslin, 2012

State Regulation: Frack Fluid Disclosure Laws and Bans



Notes:

White states have no disclosure law and no current hydraulic fracturing activity

Grey states have no disclosure law and some hydraulic fracturing activity

Primary source: McFeeley, 2012; Courtesy diymaps.net

Local Regulation: Bans, Zoning, and Other Action

- Zoning and Bans
 - Control over zoning and permitting of individual projects is the primary authority most municipalities have to regulate shale gas development within their borders
 - Zoning can be restrictive enough as to effectively ban shale gas development
 - Many towns in several states have issued blanket bans
 - Niagara Falls, NY
 - Highland, PA
 - Erie, CO (temporary moratorium)
 - Conditional zoning can be an effective means for a developer and the community to agree on mutually acceptable terms
 - Benton, Pennsylvania allowed an exploratory shale gas well to be drilled provided that the driller to allow an independent engineer on site to witness the process
- Other Local Government Action
 - Regulate technology (Fort Worth and Southlake, Texas both require green completions)
 - Officially lobby state government to take action (Buffalo, NY)

Conflicting Authority: Two Cases in 2012 of State vs. Local Authority

■ Pennsylvania

- Act 13 (passed Feb. 2012) preempted local zoning authority, establishing statewide zoning, and requiring wells and pipelines be allowed to be built in any zoning district
- Gov. Corbett claimed that when communities ban drilling, they deprive citizens of “jobs, income and the enjoyment of their property rights”
- 7 municipalities and the Delaware Riverkeeper Network challenged this provision, and 67 local governments issued official support of the challenge
- A Pennsylvania appellate court struck down the municipal zoning provisions as unconstitutional on July 26 (appeal is pending)

■ Colorado

- Town of Erie enacted 180-day moratorium on hydraulic fracturing when studies showed significant local air quality problems possibly resulting from shale gas development
- Gov. Hickenlooper created a task force to determine state and municipal authority
 - Charged task force to coordinate regulatory structures to “avoid duplication and conflict of state and local jurisdiction regulations of oil and gas activities”
- Task force “determined that drawing bright lines between state and local jurisdictional authority was neither realistic nor productive”



Conclusions

- Regulation for US shale gas development is complex, diverse, and sometimes conflicting
- Delineation of authority between levels of government is often unclear and ad hoc
- The overall state of shale gas regulation is constantly changing



Photo Credit: R. Horner

Questions?



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