

THE COLORADO EXPERIENCE: PRODUCING ENERGY WHILE PROTECTING THE ENVIRONMENT

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Colorado Is both a Major Oil and Gas Producer

- 150 year history of production
- 50,000 active wells
- 2,500 ~ new wells each year
- 2012 production:
 - o 1.7 trillion cubic feet natural gas (5th in U.S.)
 - o 40 million barrels oil (9th in U.S.)

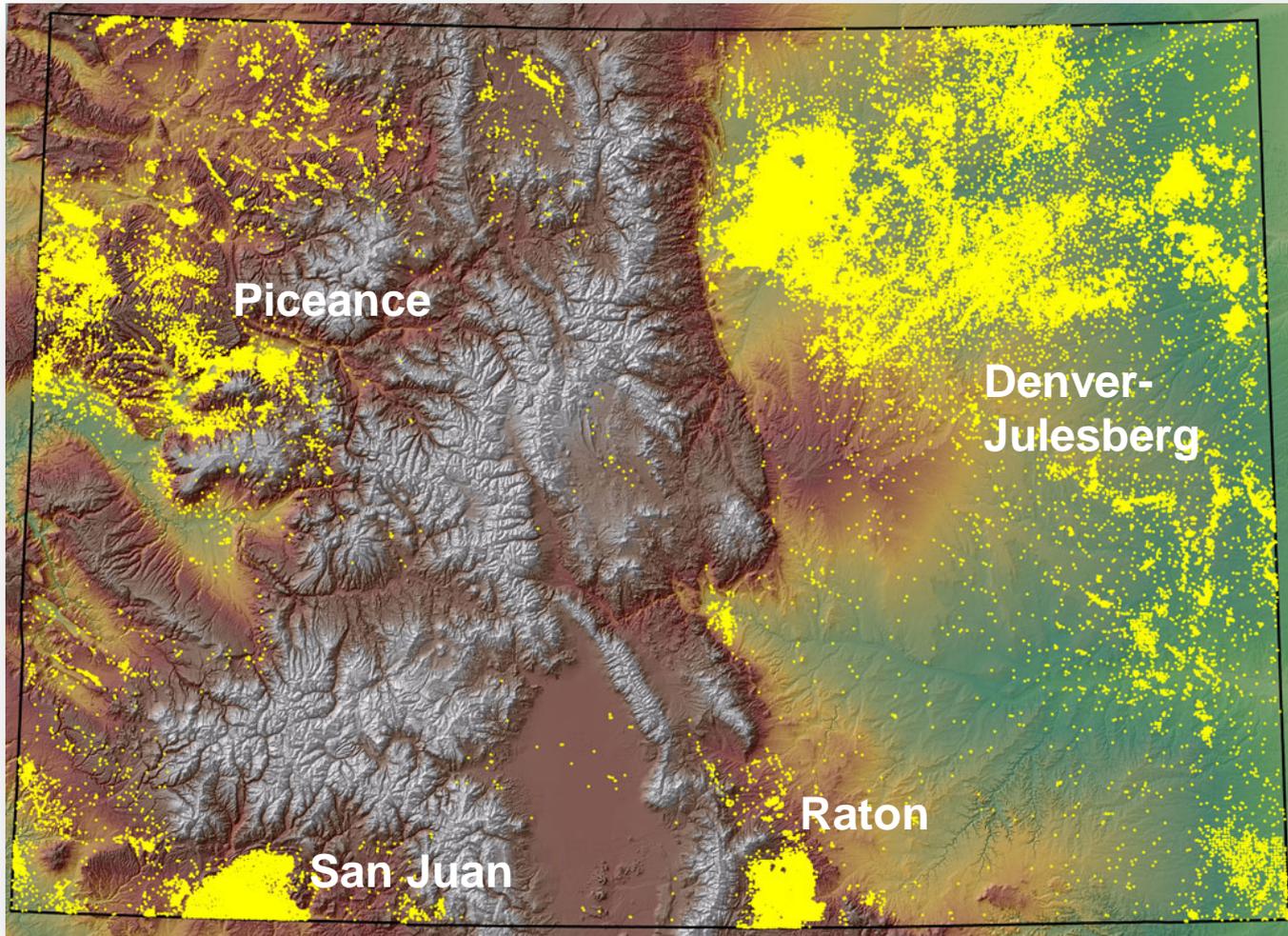


And an International Outdoor Destination

- 55 14,000-foot mountains
- 4 national parks and 41 wilderness areas
- World class wildlife
- 12 million skier visits
- 1 million fishing licenses, 650,000 hunting licenses



Colorado



Colorado has 270,000 square kilometers, and 50,000 active wells. There is tight gas in the northwest, shale gas in the northeast, and coalbed methane in the south.

Like many other states, Colorado has updated and expanded its regulatory requirements to better protect the environment and respond to public concerns. This process took 18 months during 2007-2008 and included:

- Use of existing state expertise**
- Stakeholder involvement**
- Opportunity for public participation**
- Approval by politically accountable officials**

Additional amendments were adopted in 2011, 2012, and 2013.

Several things helped make this process successful in Colorado:

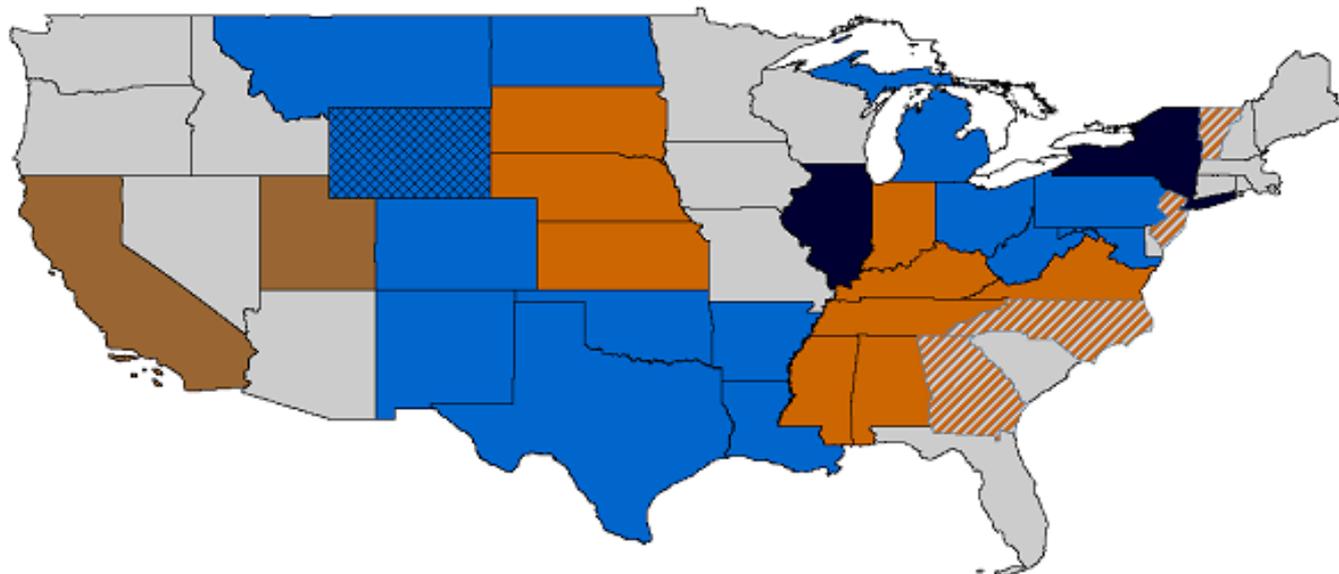
- It was legislatively authorized;
- It was inclusive; and
- The rules were unanimously approved.

Responsibly Regulating Hydraulic Fracturing

- Chemical disclosure
- Well integrity: cement bond logs and bradenhead testing
- Baseline groundwater sampling
- STRONGER review



State Fracturing Fluid Disclosure



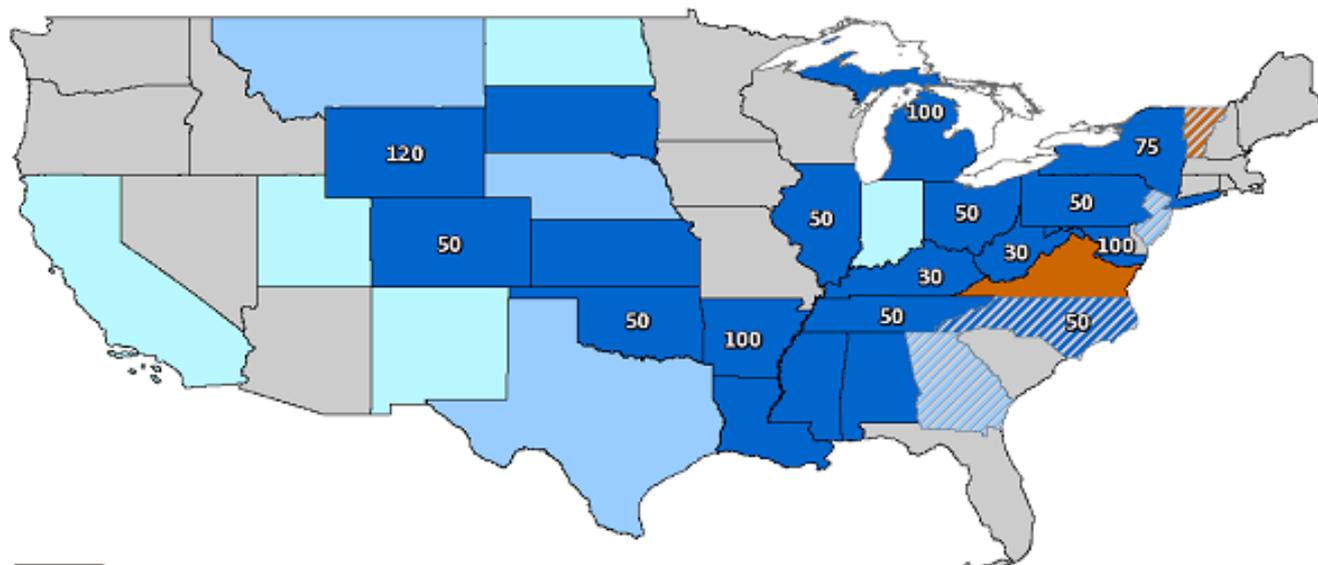
- Disclosure required*
- Proposed disclosure requirements
- No evidence of regulation
- Unable to classify
- Not in study
- Specific chemical exclusions
- No natural gas wells as of 2010

* Require volume disclosure: MD, MI, NM, OK. Concentration disclosure: WY. Volume and concentration: AR, LA, MT, OH, PA

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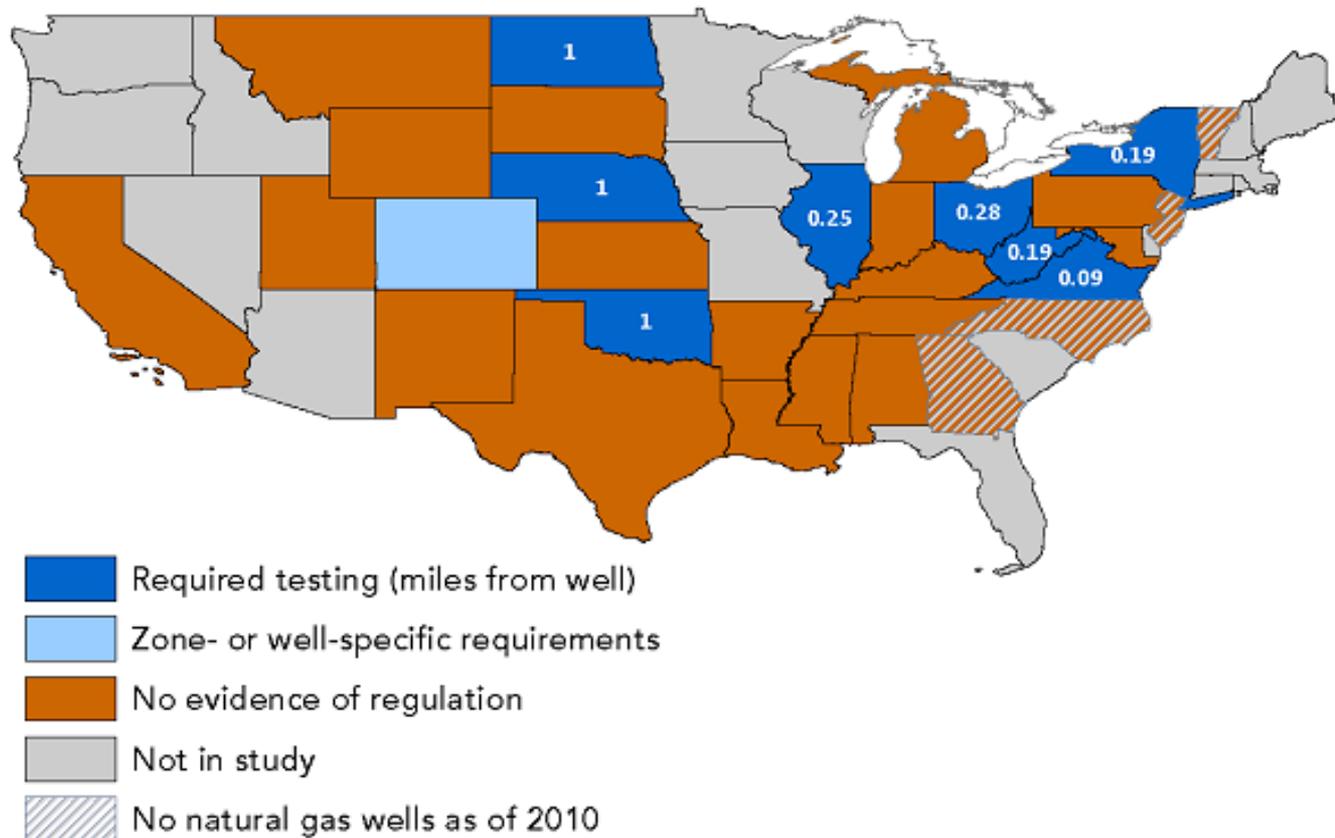


State Casing and Cementing Depths



- Specified casing and cementing depth requirements (ft. below water table)
 - Well-specific casing and cementing depth
 - Addressed in permit
 - No evidence of regulation
 - Not in study
 - No natural gas wells as of 2010
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State Groundwater Testing



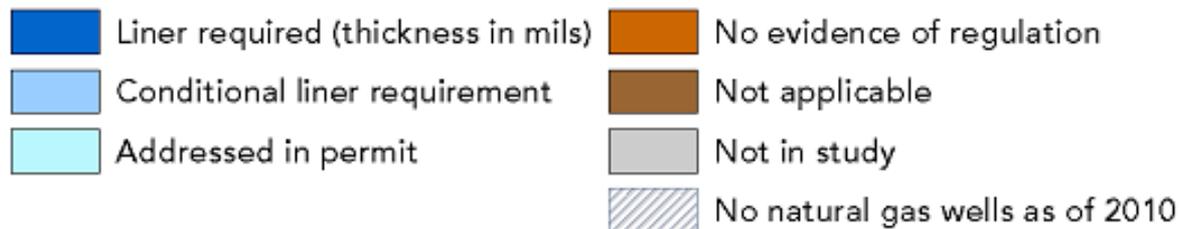
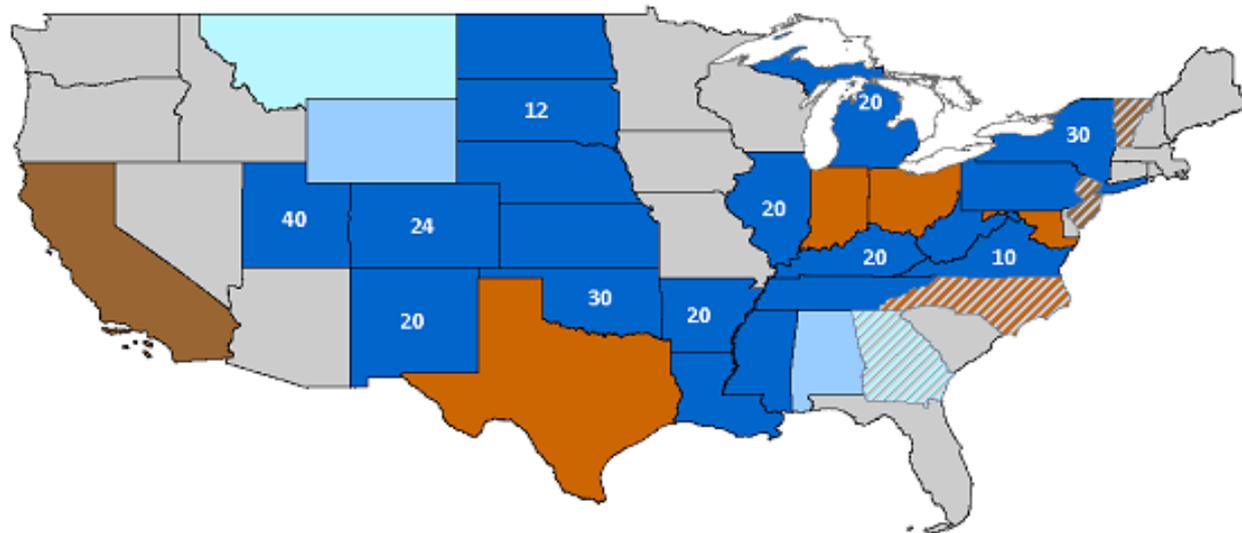
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Protecting Water Quality

- Updated pit lining requirements and encouraged the use of pitless drilling
- Increased secondary containment requirements
- Revised spill reporting requirements
- Tightened soil and ground water standards

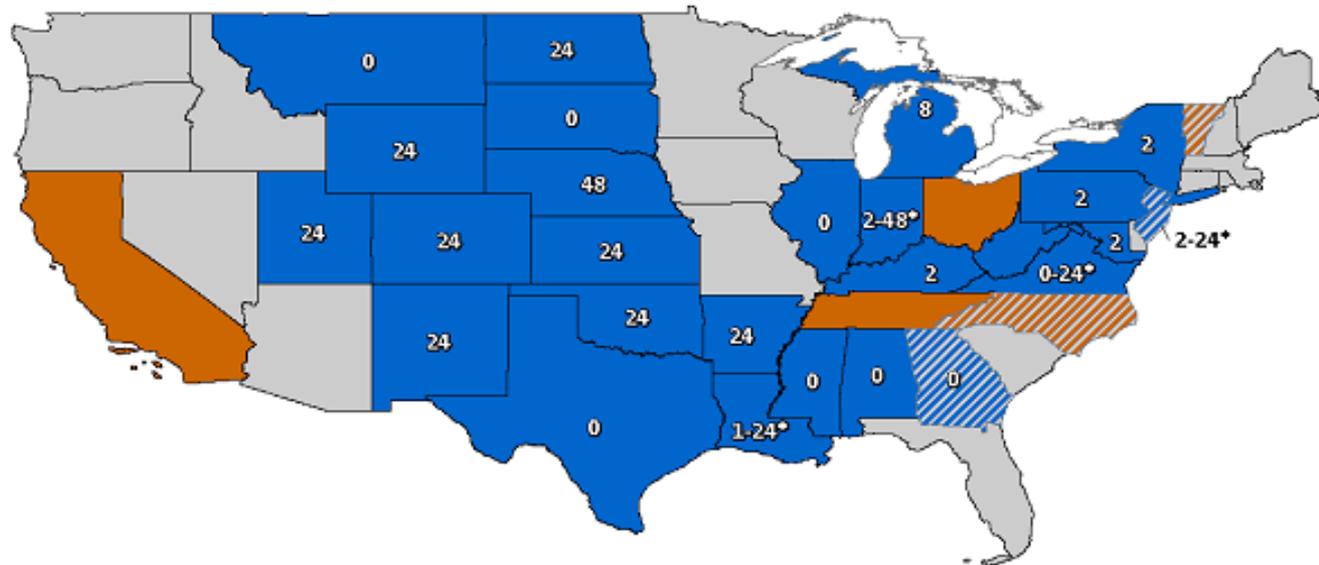


State Pit Liner Requirements



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State Spill Reporting Requirements



- Accident reporting required (maximum hours after discovery)
- No evidence of regulation
- Not in study
- No natural gas wells as of 2010

* Required reporting time varies depending on the severity of the accident.

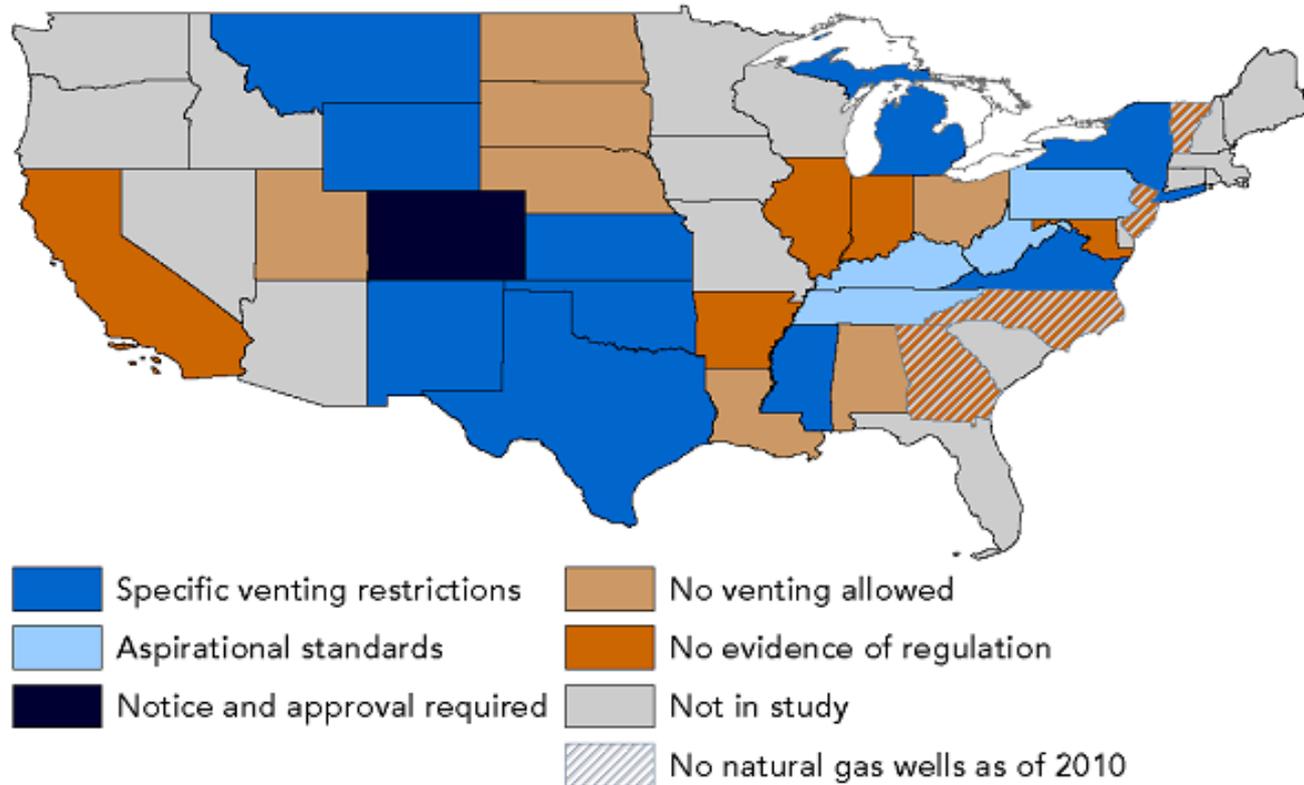
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Protecting Air Quality

- **Green completions required**
- **Emission control devices on certain production equipment**
- **Restrictions on venting**



State Venting Regulations



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Protecting Communities

- 500 foot setbacks from buildings
- Special notice, meeting, and mitigation requirements for wells within 1,000 feet of buildings
 - Noise limitations
 - Closed loop drilling
 - Green completions
 - Traffic plans
 - Waste plans
 - Leak detection



Protecting Wildlife

- Avoid the most critical habitat if feasible
- Consult with the government on other sensitive habitat
- Implement best management practices and mitigation measures



Promoting Transparency

- Permit applications posted to the internet
- Notice to local governments and nearby surface owners
- Opportunity for public comment
- Coordination with local governments



Improving Oversight:

- **More inspectors deployed in the field**
- **Greater use of technology**
- **Prompt response to complaints**

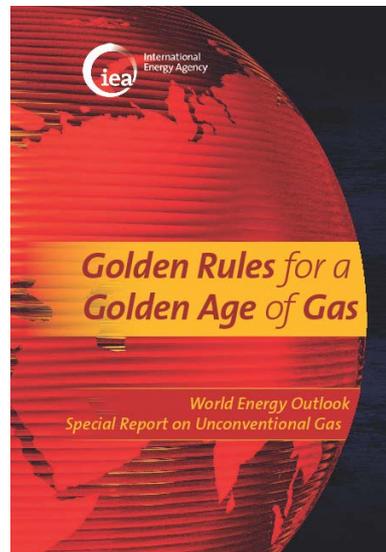


The Results in Colorado

More Energy Production	More Environmental Protection
<ul style="list-style-type: none">– 60% increase in oil production;– 15% increase in gas production; and– More new wells started than surrounding states.	<ul style="list-style-type: none">– Pitless drilling systems doubled;– >60% of fracturing fluid recycled;– >80% green completions;– Wellsites > 1,000 feet from the closest building increased by 10%; and– 14 wildlife mitigation plans covering 750 square miles of habitat

IEA's Golden Rules:

1. Measure, disclose and engage
2. Watch where you drill
3. Isolate wells and prevent leaks
4. Treat water responsibly
5. Eliminate venting and minimize flaring
6. Think big
7. Ensure consistently high environmental performance



Questions



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