Implications of Federal Law and Policy for the Shale Gas Industry – A Fast Moving River of Law, Regulations, Policy and Politics

by
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I. Overall Picture Emerges are on the regulatory and policy frontlines –

A. Environmental Protection Agency (EPA)
B. Department of Energy (DOE)
C. Department of Interior (DOI)
D. Federal Energy Regulatory Commission (FERC)
E. Securities and Exchange Commission (SEC)
F. Department of Agriculture (DOA)
G. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA)

II. Other Agencies and Departments Add to the Alphabet Soup of Washington

A. General Accounting Office (GAO)
B. Commodities Future Trading Commission (CFTC)
C. Energy Information Agency (DOE)
D. U.S. Geological Service (USGS)
E. Bureau of Ocean Energy Management, Regulation and Enforcement (DOI)
F. Bureau of Indian Affairs (BIA)
G. Pipeline Safety

III. The Administration and the Congress are at the heart of the exchange of views, policies, inquiries – Effects of NYT series on shale gas development, as well as "Gaslands" production has made a complex issue a highly politicized battle, one not only of partisan politics, but regional differences as well –

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III. The Administration and the Congress are at the heart of the exchange of views, policies, inquiries – Effects of NYT series on shale gas development, as well as "Gaslands" production has made a complex issue a highly politicized battle, one not only of partisan politics, but regional differences as well –

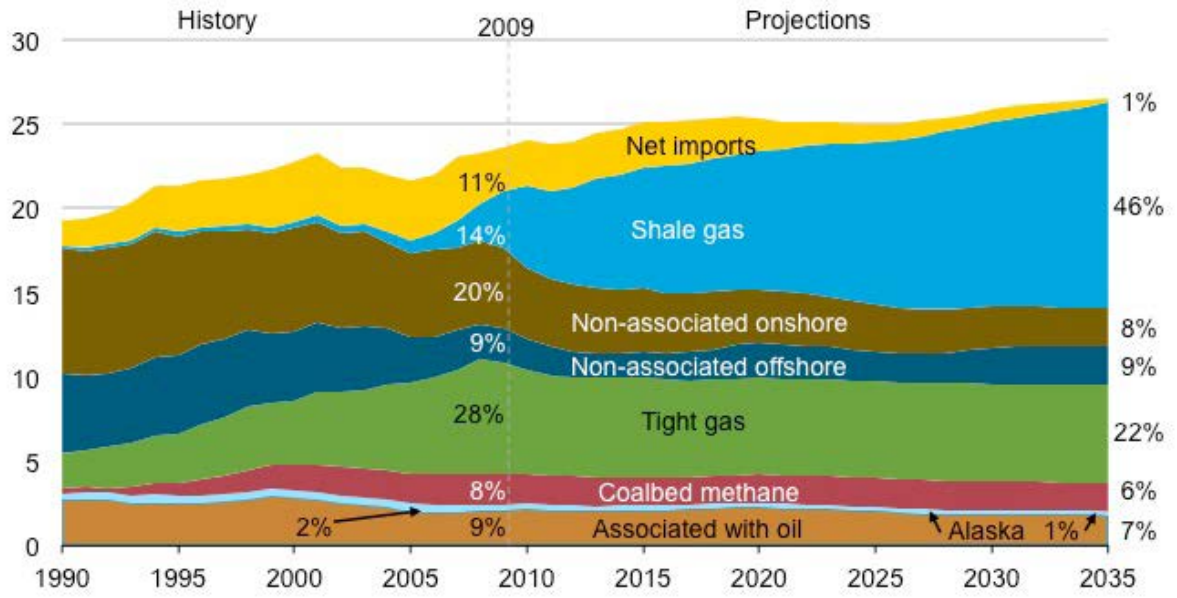
A. Congress is a key player! Oversight hearings and inquires/proposed legislation
   1. Senate
   2. House of Representatives

B. Administration heavily reliant on natural gas "secret sauce", contribution to national energy supply mix in transition away from coal; questions on nuclear

Why Almost Every Player/Agency in DC is Involved

Shale gas offsets declines in other U.S. supply to meet consumption growth and lower import needs

U.S. dry gas
trillion cubic feet per year



Source: EIA, Annual Energy Outlook 2011

eia AEO2011, April 2011 24

Why So Many States, Tribes, Land Owners, Including US Government Are Involved

Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI.
Updated: May 9, 2011

IV. EPA active yes, but one of <u>many</u> players, as the industry pushes forward and the other players maneuver for key roles in the debate – Water, Air, Land Use, Endangered Species, Other EPA Issues

A. Case Study Locations for Hydraulic Fracturing Study

1. EPA has selected seven case studies located in various formations locations across the country that the Agency believes will provide the most useful information about the potential impacts of hydraulic fracturing on drinking water resources under a variety of circumstances. Two prospective case studies, where EPA will monitor key aspects of the hydraulic fracturing process at future hydraulic fracturing sites, are located in:
   i. Haynesville Shale – DeSoto Parish, LA
   ii. Marcellus Shale – Washington County, PA
2. Five retrospective case studies, which will investigate reported drinking water contamination due to hydraulic fracturing operations at existing sites, are located in:

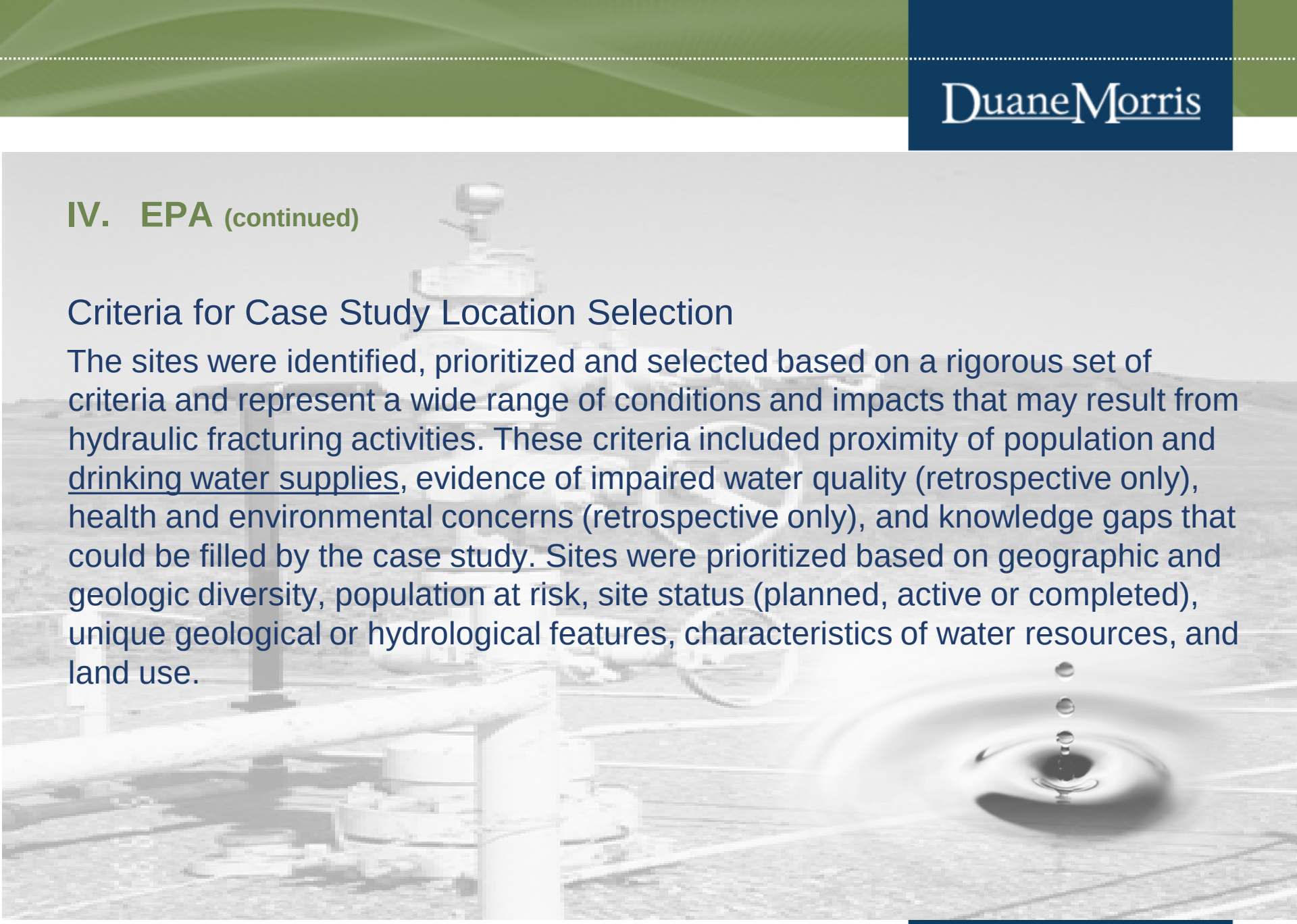
IV. EPA (continued)

Location	Key Issues to be Investigated	Potential Outcomes
Bakken Shale—Killdeer and Dunn Counties, ND	• Production well failure during hydraulic fracturing • Suspected drinking water aquifer contamination	• Identify sources of well failure • Determine if drinking water resources are contaminated and to what extent
Barnett Shale—Wise and Denton Counties, TX	• Possible drinking water well contamination • Spills and runoff leading to suspected drinking water well contamination	• Determine if private water wells are contaminated • Obtain information about the likelihood of transport of contaminants via spills, leaks, and runoff
Marcellus Shale—Bradford and Susquehanna Counties, PA	• Ground water and drinking water well contamination • Suspected surface water contamination from a spill of fracturing fluids • Methane contamination of multiple drinking water wells	• Determine if drinking water wells are contaminated • Determine source of methane in private wells • Transferable results due to common types of impacts
Marcellus Shale—Washington County, PA	• Changes in drinking water quality, suspected contamination • Stray gas in wells, surface spills	• Determine if drinking water wells are contaminated • Determine if surface spills affect surface and ground water • If contamination exists, determine potential source of contaminants in drinking water
Raton Basin—Los Animas County, CO	• Potential drinking water well contamination (methane and other contaminants) in an area with intense concentration of gas wells in shallow surficial aquifer (coalbed methane)	• Determine source of methane • Identify presence/source of contamination in drinking water wells

IV. EPA (continued)

Criteria for Case Study Location Selection

The sites were identified, prioritized and selected based on a rigorous set of criteria and represent a wide range of conditions and impacts that may result from hydraulic fracturing activities. These criteria included proximity of population and drinking water supplies, evidence of impaired water quality (retrospective only), health and environmental concerns (retrospective only), and knowledge gaps that could be filled by the case study. Sites were prioritized based on geographic and geologic diversity, population at risk, site status (planned, active or completed), unique geological or hydrological features, characteristics of water resources, and land use.



IV. EPA (continued)

B. Water, water everywhere – but is it safe to drink? Central tenet – Clean Water Act issues abound, EPA focus in significant part is on groundwater and drinking water, impacts of the hydraulic fracing technique employed to extract shale gas. EPA policy is not to do a total risk assessment, but rather a study of risk to drinking water at this time;

C. Plan for study announced in EPA's Interim Study – to be issued at end of 2012 and Final Report in 2014 – Many ask – is this too slow to be relevant? Is four years simply too long to study and recommend?

1. Will the industry itself and the techniques it employs have advanced by then to make effort obsolete?
2. Will other agencies, including State agencies have moved to the front of the pack, making EPA efforts less relevant?
3. Will DOE study eclipse EPA's water studies?
4. Role of multi-interest stakeholder groups already at work resolving problems

IV. EPA (continued)

D. Role of the Science Advisory Board, on the issues of ground water issued 6/11

E. EPA Office of Groundwater – already taking action on impact not only of chemicals and other materials used in process, but on issues of well construction and integrity.

   1. Use of diesel fuel in fracing process already subject of regulation by EPA
   2. Overtakes State efforts

E. Land use issues

IV. EPA (continued)

F. Air issues – Overall emissions issues and Green House Gas (GHG) emissions – implications of the entire process; environmental and community concerns including noise issues

The Environmental Protection Agency has the responsibility to regulate air emissions and in many cases delegate its authority to states. On July 28, 2011, EPA proposed amendments to its regulations for air emissions for oil and gas operations. If finalized and fully implemented, its proposal will reduce emissions of VOCs, air toxics and, collaterally, methane. EPA's proposal does not address many existing types of sources in the natural gas production sector, with the notable exception of hydraulically fractured well re-completions, at which "green" completions must be used. ("Green" completions use equipment that will capture methane and other air contaminants, avoiding its release.) EPA is under court order to take final action on these clean air measures in 2012. In addition, a number of states – notably, Wyoming and Colorado – have taken proactive steps to address air emissions from oil and gas activities.

IV. EPA (continued)

G. CRADLE TO GRAVE ANALYSIS appearing in EPA activity with other agencies – see e.g., FERC comments in pipeline certificate proceedings

H. Relationship with States – a work in progress – Preemption by EPA or other Federal entities of current State Authority over most hydraulic fracing activities

V. Department of Energy Takes the High Ground to Carve Out Leadership Role

A. DOE Organizes Secretary of Energy Advisory Board ("SEAB") Shale Gas Subcommittee, with substantial input from DOE, DOI, EPA – charged with identifying measures that can be taken to reduce the environmental impact and improve the safety of shale gas production.

B. Moves to establish structure of oversight, transparency, continuous improvement and best management practices. May 2011.

V. Department of Energy Takes the High Ground to Carve Out Leadership Role

C. August 2011, "SEAB" Shale Gas Production Subcommittee Ninety-Day Report – Recommendations –

1. Improve public information about shale gas operations
2. Improve communication among state and federal regulators
3. Improve air quality – supports rigorous adoption of rigorous standards for new and existing sources of methane, air toxics, ozone precursors and other air pollutants from shale gas operations
   - i. Collect data from producers in different basins
   - ii. Launch federal interagency planning to acquire data and analyze GHG footprint of shale gas operations throughout the lifecycle of natural gas use in comparison to other fuels
   - iii. Encourage shale gas productions companies and regulators to expand immediately efforts to reduce air emissions using proven technologies and practices

V. Department of Energy Takes the High Ground to Carve Out Leadership Role

C. August 2011, "SEAB" – Recommendations – (continued)

4. Protection of water quality – consistent measurement and public disclosure of the flow and composition of water at every stage of process.
   - i. Measure and reports composition of water stocks and flow through the process
   - ii. Manifest all water transfers
   - iii. Adopt best practices in well development and construction – especially casing, cementing and pressure management. Regulations and inspections needed.
   - iv. Field studies on possible methane leakage to water supply
   - v. Adopt requirements for measurement of water quality. Advance reporting.
   - vi. Agencies to review field experience and modernize rules and enforcement to ensure water supply protection.

V. Department of Energy Takes the High Ground to Carve Out Leadership Role

C. August 2011, "SEAB" – Recommendations – (continued)

5. Disclosure of fracturing fluid compositions. Accelerate progress.
6. Reduce diesel fuel use
7. Managing short-term and cumulative impacts on environment.
   - i. Multi-well drilling pads
   - ii. Evaluation of water use at scale of affected watersheds
   - iii. Formal notification by regulated entities of anticipated environmental and community impacts
   - iv. Preservation of unique or sensitive areas
   - v. Science based characterization of important landscapes, habitats and corridors to inform process
   - vi. Establish effective field monitoring and enforcement for ongoing assessment purposes.

V. Department of Energy Takes the High Ground to Carve Out Leadership Role

C. August 2011, "SEAB" – Recommendations – (continued)

8. Organizing for best practices.
   i. Create industry shale gas production organizations for continuous improvement, rely on measurement and field experience. National approach favored, including regional mechanisms to recognize differences in geology, land use, water resources and regulations.
   ii. Focus on air and water.
9. R and D needs. Technical advances. Increase Federal R and D support. And – US support $5 million for STRONGER (State Review of Oil and Natural Gas Environmental Regulation) and Ground Water Protection Council's Risk Based Data Management System – both are multi-stakeholder mechanisms

D. NEXT REPORT Due in 180 DAYS.

E. Interim Report received fairly broad acceptance as reasonable perspective, addressing both industry and environmental concerns

VI. Federal Energy Regulatory Commission (FERC) – the NEPA Process as Applied to Interstate Pipeline Certificate Applications under the Natural Gas Act

A. FERC jurisdiction is over natural gas pipeline and storage facilities when in interstate commerce

B. FERC has NEPA lead agency role in these proceedings, determining whether an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) is required. Size of project, sensitivity of location, opposition, nature of interveners (e.g. state agencies or other governmental entities) might impact the decision.

C. Natural Gas Act certificates issued on basis of "public convenience and necessity" includes economic, rate, and environmental analysis

VI. Federal Energy Regulatory Commission (FERC) – the NEPA Process as Applied to Interstate Pipeline Certificate Applications under the Natural Gas Act (continued)

D. FERC may have obligation to consider the cumulative impact of the shale gas development, i.e. a "cradle to grave" analysis, which would include, for example, the impact of highway construction, housing of workers, road utilization, etc. throughout the shale development, production, transportation, and storage process. Latest comments for EPA Region III in the EA process for the MARC I HUB Line Project, Docket NO. CP10-480-00 indicate the EPA is under NEPA and Section 309 of the Clean Air Act (CAA), desire for a thorough review and consideration of non-gas related development, future development of the shale gas and past and or present development of any type.

VI. Federal Energy Regulatory Commission (FERC) – the NEPA Process as Applied to Interstate Pipeline Certificate Applications under the Natural Gas Act (continued)

D. P. 3 of EPA's comments filed July 11 at FERC state the "EPA recognizes the prominent role that the FERC has with respect to this industry, and hopes to cooperate with FERC and other agencies as plans for this and other natural gas transmission lines are proposed." Yet it also stated that FERC's rationale for not preparing an EIS vs. EA was unconvincing, and EPA made clear that linear construction projects of the magnitude of the MARC I HUB line warrant preparation of a full EIS. (continued)

1. EPA submitted detailed comments on a variety of issues, including questions on the basic need for the project, water quality, fisheries impact, forested land impact, vegetation and wildlife, alternatives potentially available and similar
2. Cumulative impacts were heavily commented upon by EPA.

VI. Federal Energy Regulatory Commission (FERC) – the NEPA Process as Applied to Interstate Pipeline Certificate Applications under the Natural Gas Act (continued)

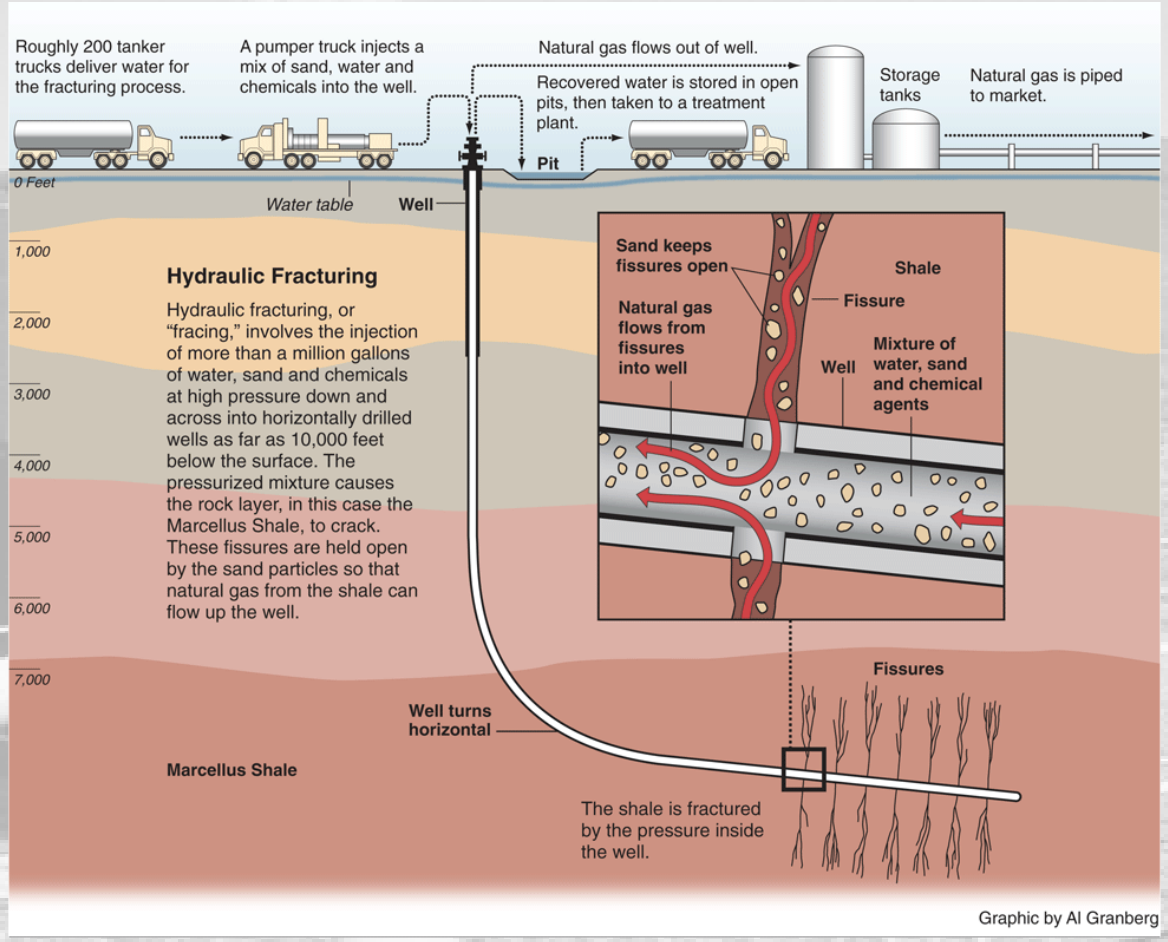
E. Abandonment applications would also be necessary to terminate the certificate.

F. Complex and lengthy process for major pipeline certificates.

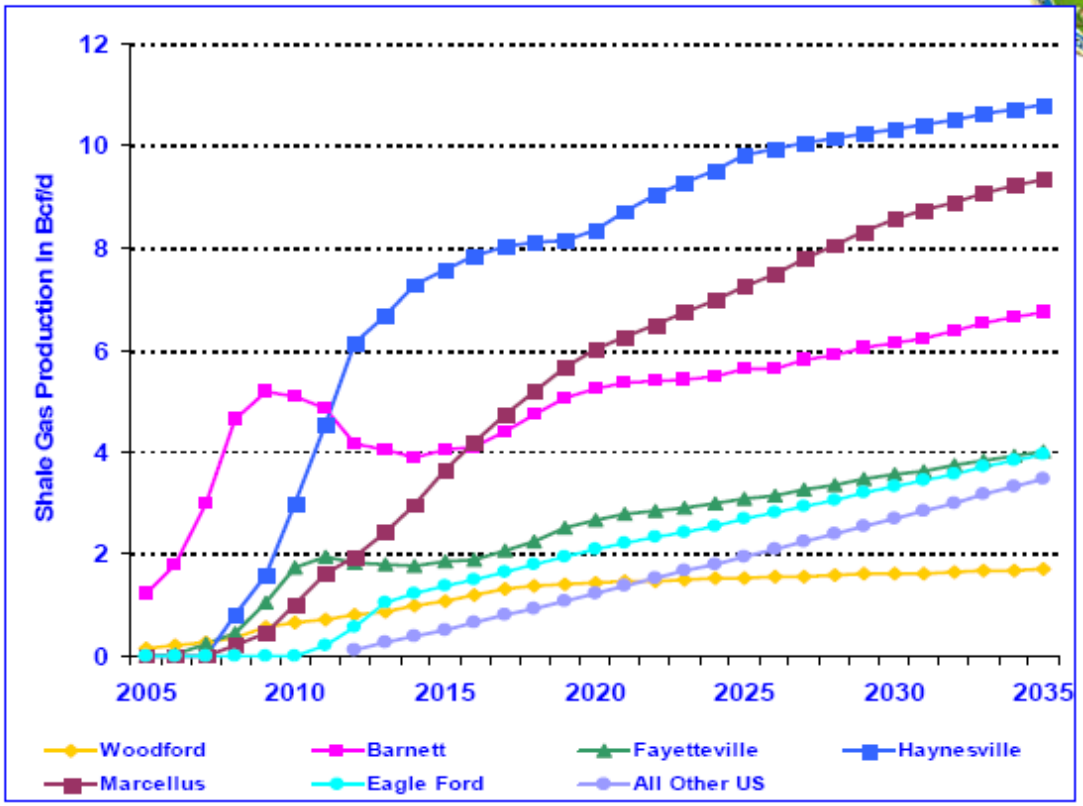
G. Cradle to grave analysis

1. FERC's view of the world is broadening
2. Analogize to the Federal Power Act analysis of hydropower licensing process – watershed impacts
3. See also NIETC's (National Interest Electric Transmission Corridors) analysis

Part of the FERC Analysis



Shale Gas Estimates



Source: Based on data from ICF International and Compass Report January 2011

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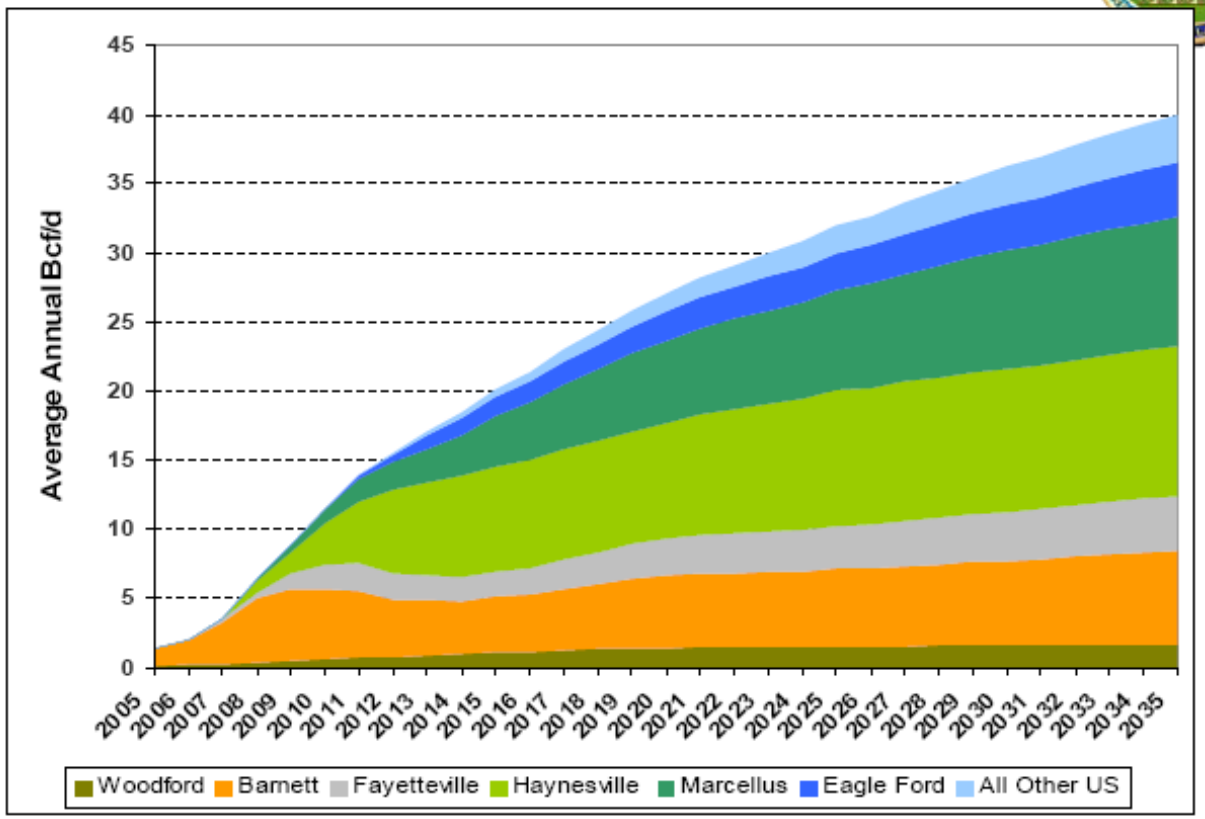
Shale Gas Estimates



Source: Based on data from ICF International and Compass Report January 2011

Summary of FERC Related Projects and Potential Projects Impacting the Shale Basins

FERC

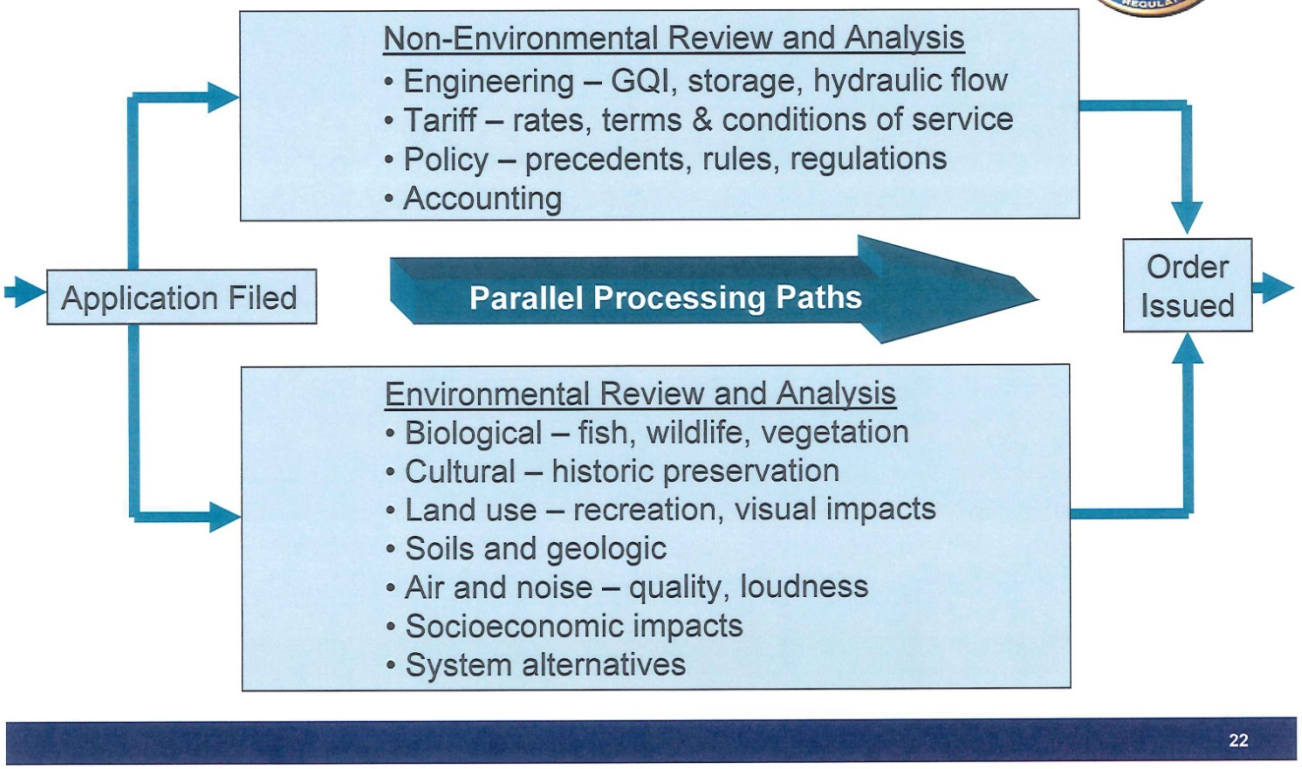
Natural Gas Basin	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)	Cost (Millions)
Total Barnett	2,027	230	91,940	$602
Total Barnett, Woodford & Fayetteville	3,532	877	290,070	$3,517
Total Fayetteville	6,032	448	122,107	$2,240
Total Woodford	638	50	19,500	$134
Total Haynesville	3,230	196	229,716	$1,618
Total Marcellus	6,616	634	404,347	$3,130
Total Various Supplies	3,910	638	283,334	$2,168
Grand Total	26,164	3,073	1,441,014	$13,409

Potential

Natural Gas Basin	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)
Total Barnett	2,139	40	9,500
Total Barnett & Woodford	1,800	175	70,000
Total Fayetteville	1,100	346	100,000
Total Bakken	130	100	0
Total Haynesville	1,100	0	20,260
Total Marcellus	4,988	962	0
Grand Total	11,257	1,623	199,760

Source: FERC

Certificate Process Overview



State and Local Permits

- FERC encourages cooperation between interstate pipelines and local authorities.
- During the environmental review, staff works with state and local permitting agencies to identify and minimize conflicting requirements
- If the Commission approves a project, state or local permits must be consistent with the conditions of any FERC certificate
- State and local agencies may not prohibit or unreasonably delay the construction or operation of facilities approved by the Commission

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FERC as the Lead Agency

- FERC is the lead agency for NEPA review and coordinator of all federal authorizations
  - Agencies urged to participate in process
- FERC establishes the schedule for all Federal authorizations
  - Ensures expeditious processing of all natural gas project permits and authorizations
  - Congress saw need for expediting the federal review of new infrastructure
- FERC maintains a complete consolidated record
  - Provides for swift judicial review

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The Environmental Report (13 Resource Reports)

1. General Project Description
2. Water Use & Quality
3. Fish, Wildlife & Vegetation
4. Cultural Resources
5. Socioeconomics
6. Geological Resources
7. Soils
8. Land Use, Recreation & Visual Impacts
9. Air Quality & Noise
10. Alternatives
11. Reliability & Safety
12. PCB Contamination (for pipelines only)
13. LNG Engineering & Design Details

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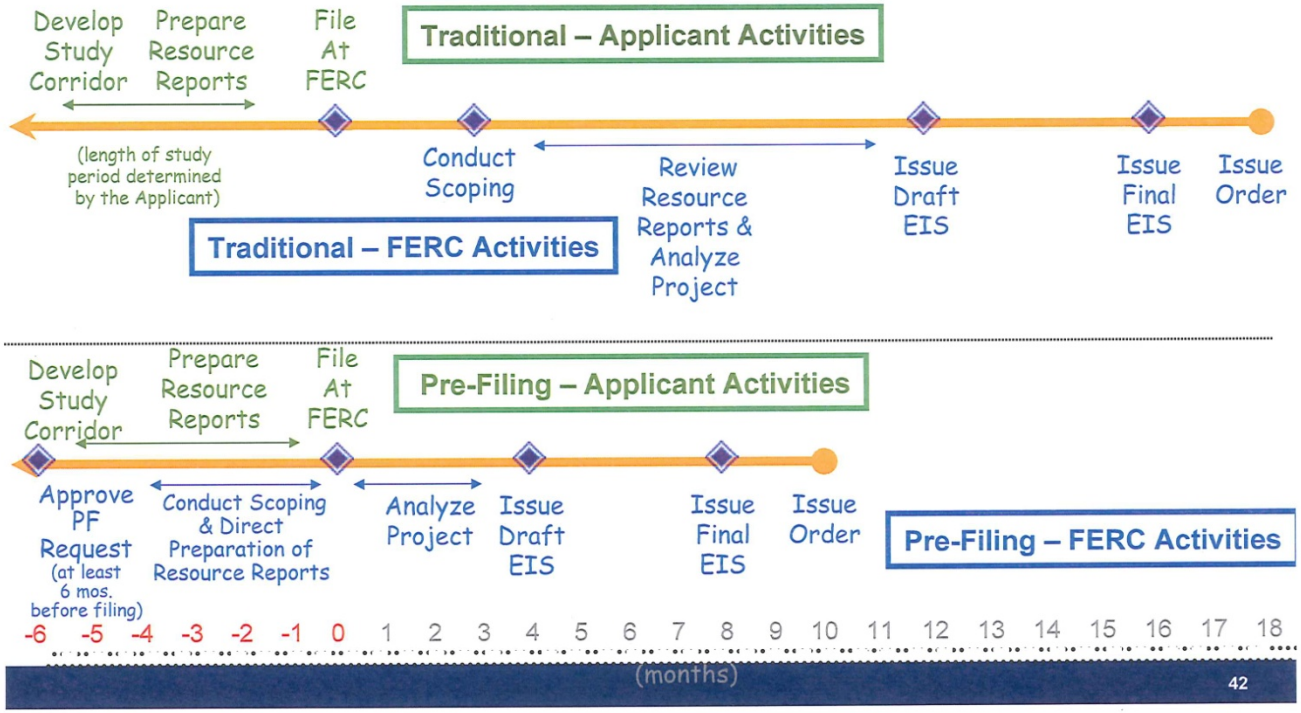
Timelines: Traditional vs. Pre-Filing Process



VII. Department of Interior

A. A Vast Array of Activity at DOI in the Shale Gas Arena including contribution to SEAB shale study

B. Bureau of Land Management (BLM) – BIA – National Park Service
   1. Eleven percent of US gas reserves are on public land; of those – ninety percent use hydraulic fracing techniques
   2. Fifty million acres of Federal Land are leased for oil and gas development
   3. No Congressional approval is necessary to implement changes to drilling rules

C. DOI recognizes that most regulatory power is in the hands of the States/However under SEAB Process that could change

D. Major initiative is to require drillers to report the makeup of fracing fluids. Transparency and full disclosure envisioned. Hotly opposed by many in industry. Note that EPA subpoenaed Halliburton to obtain this data.

VII. Department of Interior (continued)

E. BLM is seeking to implement best practices on well drilling, seeking to prevent blowouts and to prevent escape of fracing fluids into surface water supply and ground water

F. Secretary Salazar has embraced the disclosure rules of the State of Wyoming as a model for Federal lands as well

G. Tribal lands are also open to shale gas development – rules developing further for those lands.

H. Decisions on new leases will be impacted by environmental drivers more than any other factors

VIII. State Department/Department of Commerce

A. Major initiatives in shale gas development with China and Poland, to transition from coal reliance for electric generation
   1. GHG issues
   2. Technological sharing
   3. Grants
B. USAID grants and studies, among other efforts
C. Trade and Development Agency
D. Other efforts; environmental considerations at every turn
E. Jobs, jobs, jobs in hydraulic fracing industry – could help economy dramatically – see e.g. Pennsylvania

IX. Department of Agriculture

A. Development of resources on farmland/National Forests – drilling and development.
B. Rural Utilities Service (RUS).
C. In concert with renewable development (wind, solar) – potential contributors to solutions to GHG issues.

X. Securities and Exchange Commission (SEC)

A. Reporting of fluids used in Hydraulic Fracing Process/2012 implementation proposal.
B. Questions/Reporting on Reserves Quantity and Quality.
C. Senate Energy Bill (issues).

XI. Final Observations