Update on US EPA Guidance on Use of Diesel Fuels in Hydraulic Fracturing

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Outline

- Statutory Authorities
- Guidance Purpose
- Program Framework
- Key Technical Requirements
- Timeline

EPA Position on Shale Gas Development

- Natural gas plays a key role in our nation's clean energy future

- EPA is working to ensure that America's shale gas resources are developed responsibly so that public health is protected as the nation gains important economic and energy security benefits

- Agency is taking action to improve our scientific understanding of hydraulic fracturing, provide regulatory clarity with respect to existing laws, and use existing authorities to enhance health and environmental safeguards

- We do not need to choose; we can do both – develop our energy resources, and do so in a responsible way that protects the public health and our vital drinking water resources.

Shale Gas and the Environment

- Natural gas exploration, drilling and production may have many environmental impacts
  - Site selection and preparation
  - Staging, transport, water withdrawal and chemical storage
  - Drilling
  - Well completion
  - Air emissions
  - Wastewater handling
  - Well abandonment and plugging
- Advances in drilling and production technologies have positive and negative impacts
- Environmental and safety regulations are important for ensuring safe natural gas production

Safe Drinking Water Act

Statutory Authority:

- Definition of "underground injection" (as revised by 2005 Energy Policy Act section 1421(d)(1)(B)) excludes:
  - (i) the underground injection of natural gas for purposes of storage; and
  - (ii) the underground injection of fluids or propping agents **(other than diesel fuels) pursuant to hydraulic fracturing operations related to oil,** gas, or geothermal production activities.

- 1421(b)(1)(A) requires State UIC programs to prohibit underground injection not authorized by a permit issued by a state (or permitted by rule)

- SDWA provides EPA the authority permits for activities using diesel fuels but not to ban its use

- States have the option to ban diesel in their own programs

UIC Program

- EPA regulates six classes of UIC well (Classes I – VI)
- Class II wells may inject fluids associated with oil and natural gas production
  - **Enhanced recovery** wells which inject fluid or gas to recover residual oil and gas after primary production has occurred (including HF with diesel)
  - **Disposal** wells which inject fluids associated with oil and gas production or gas storage operations (including wells used to dispose of flowback from hydraulic fracturing)
  - **Hydrocarbon storage** wells which inject liquid hydrocarbons for storage, usually as part of the US Strategic Petroleum Reserve

Permitting Guidance for HF Using Diesel Fuels

UIC Regulations – Key Citations

- 40 CFR 144.12(a):
  - No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water…

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UIC Regulations – Key Citations

- 40 CFR 144.52(a)(9):
  - *Additional Conditions.* The Director shall impose on a case-by-case basis such additional conditions as are necessary to prevent the migration of fluids into underground sources of drinking water.

Examples: Tailored permit conditions

- WY - ground water monitoring to detect gas migration
- CO – pressure fall off testing to determine reservoir flow regime

UIC Primacy States

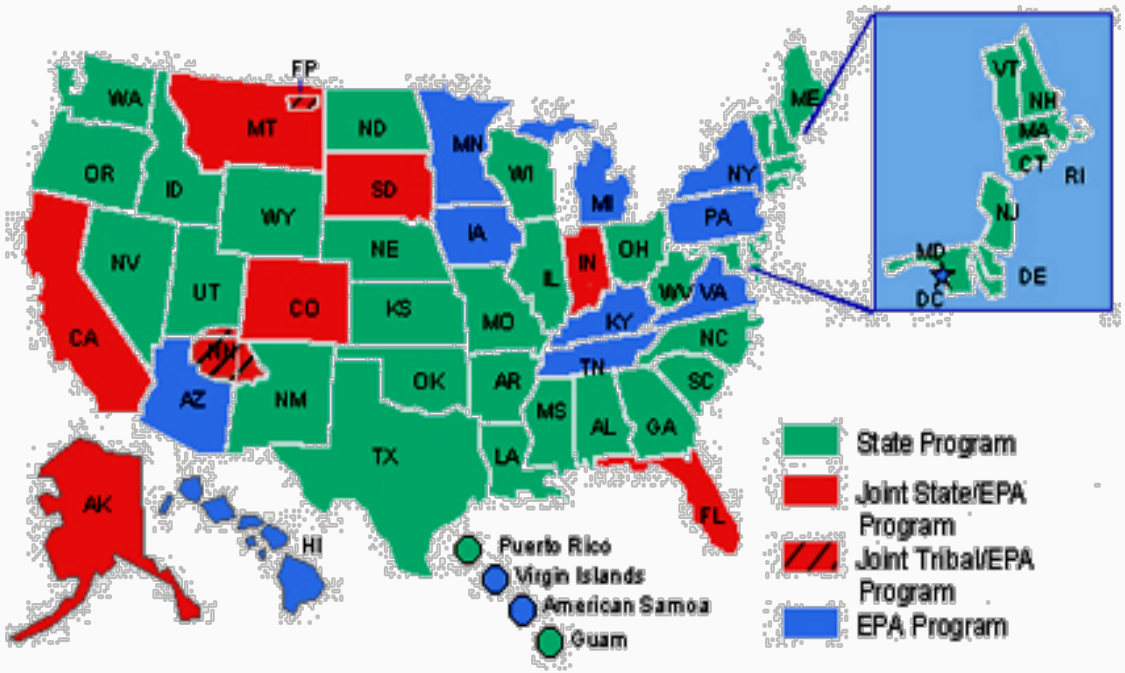
- Law encourages that states take “primary enforcement authority” for the UIC program

- For Class II wells, states have to meet specific federal requirements, or demonstrate that they are effective in preventing underground injection which endangers drinking water sources

- States can be, and are often, more stringent that minimum federal requirements

- EPA is responsible for implementing a program when a state chooses not to, or is unable to obtain federal approval, to do so

UIC Program Implementation



- 33 States have primary enforcement authority (primacy) for the UIC program
- 2 Tribes (Fort Peck and Navajo) have primacy for Class II
- EPA and States share program implementation in 7 States
- EPA directly implements the entire UIC Program in 10 states

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Purpose

Provide UIC Program Directors guidance and clarify how existing regulations under the SDWA UIC Program apply to permitting for underground injection of fluids or propping agents containing diesel fuels used in HF operations related to oil and gas production.

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Stakeholder Input

The Agency held four technical webinars with specific stakeholder groups.

- State and Tribal Partners: May 9, 2011
- Federal Partners: May 10, 2011
- Industry Representatives: May 11, 2011
- Environmental Organizations: May 16, 2011
- Detailed summaries for each meeting are available on the web

http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydroout.cfm

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Program Framework

- Intermittent Duration
- High Pressure
- Long Laterals
- Diesel Fuels

Special considerations for Hydraulic Fracturing Using Diesel Fuels

UIC Program Components

- Site Characterization
- Area Of Review
- Well Construction
- Well Operation
- Monitoring
- Well Plugging
- Closure
- Public Participation

- Tailored Approach
- Harmonizes with Existing Programs
- Consistent with Safe Drinking Water Act Mandates
- Protects Underground Sources of Drinking Water

Guidance for Hydraulic Fracturing Using Diesel Fuels

Key UIC Technical Requirements

Well Construction

Class II Requirements	Stakeholder Suggestion for Adjustments to Well Construction
• Wells must be cased and cemented to prevent fluid movements that endanger USDWs (40 CFR 146.22)	• Require that surface casing and cement extend through the base of the lowermost underground source of drinking water

Key UIC Technical Areas

Area of Review

Class II Requirements

- Use a minimum one-fourth (¼) mile fixed radius around the well or;
- Calculate the zone of endangering influence (ZEI) (40 CFR 146.6)

Stakeholder Suggestion for Adjustments to Area of Review

- Modify the one-fourth (¼) mile fixed radius approach so that it takes into account horizontal portion of well

Key UIC Technical Requirements

Site Characterization

Class II Requirements	Stakeholder Suggestions for Adjustments to Site Characterization
• Appropriate chemical and physical analysis of injected fluid composition (40 CFR 146.24(a)(4)(iii))	• Detailed analysis of fracturing fluid composition to include volume and concentrations of constituents
• Descriptive data on injection and confining zones (40 CFR 146.22)	Additional data on injection and confining zones
• Geomechanical data (40 CFR 146.24(a)(5))	• Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s); seismic history

Key UIC Technical Requirements

Plugging and Abandonment

Class II Requirements

- Must have a P&A plan
- Plug well prior to abandoning to prevent fluid movement; use cement
- Submit post-P&A report (40 CFR 144.52(p))

Stakeholder Suggestion for Adjustments to Plugging and Abandonment

- Provide options for converting wells from the UIC program to state oil and gas production programs (including conversion of P&A plans)

Key UIC Technical Requirements

Public Notification

Class II Requirements

- Directors must give public notification of all permit actions
- 30 day public comment period and 30 day notice of a planned hearing (40 CFR 124.10)

Stakeholder Suggestion for Adjustments to Public Notification

- Provide more specifics on modes of outreach and what audiences should be included
- Begin planning for public notification as soon as a new injection well is proposed
- Make a special effort to consider environmental justice in the permitting process

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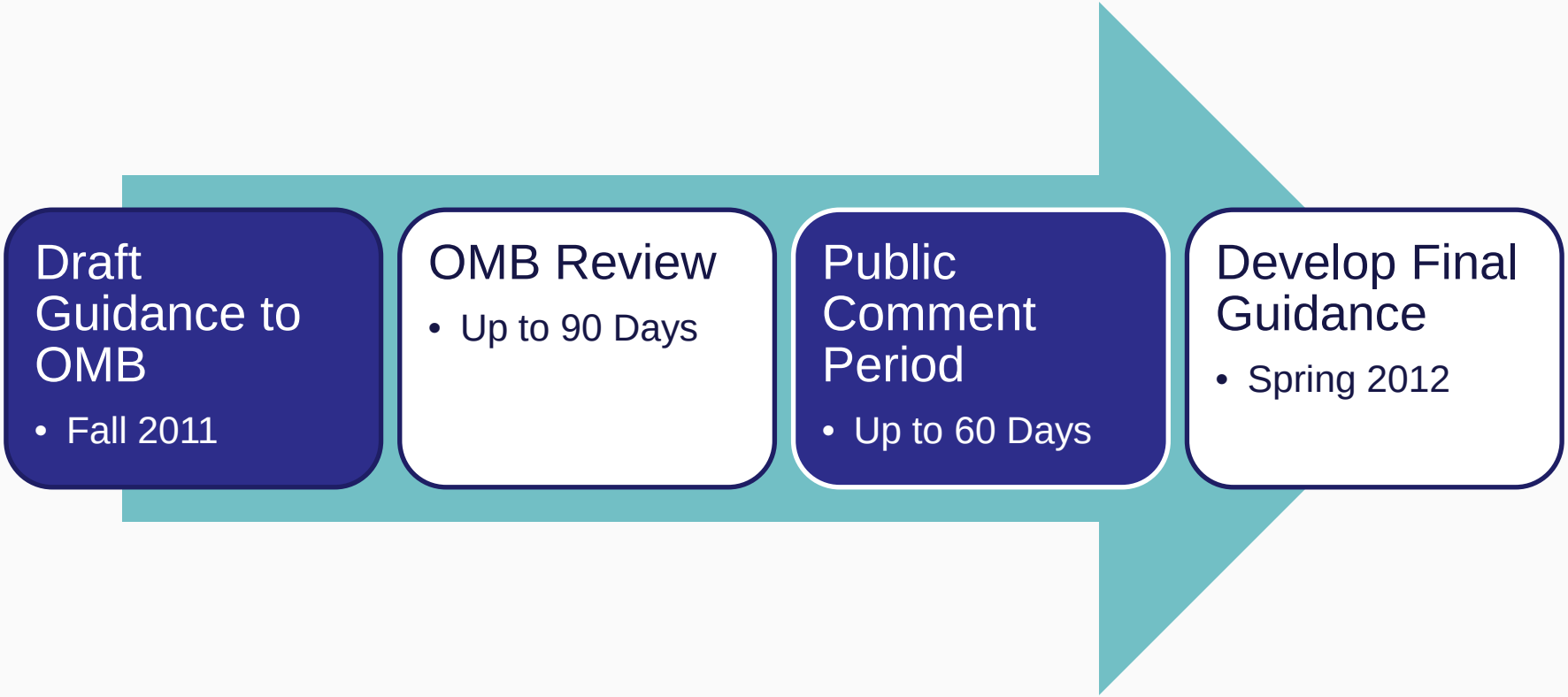
Timeline 2011



Questions?