Draft Permitting Guidance for Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels

Tribal Consultation Webinar

June 25, 2012

Drinking Water Protection Division
Office of Ground Water and Drinking Water

Outline

1. Meeting Purpose

2. Background

- Hydraulic Fracturing
- Regulatory Authority under the Safe Drinking Water Act
- Hydraulic Fracturing Using Diesel Fuels
- The EPA Underground Injection Control Program

3. Draft Permitting Guidance

- Purpose
- Contents
- Impact on Indian Country

4. Next Steps and Comment Submissions

EPA Perspective on Hydraulic Fracturing

- Natural gas is a critical source of energy for the U.S.
- We need to develop our oil and natural gas resources in a responsible manner
- We do not need to choose between developing our energy resources and protecting the public's health and our vital drinking water resources

Session Purpose

- Provide an overview and background on the guidance
- Solicit feedback on the guidance content
- Offer additional options for providing comment

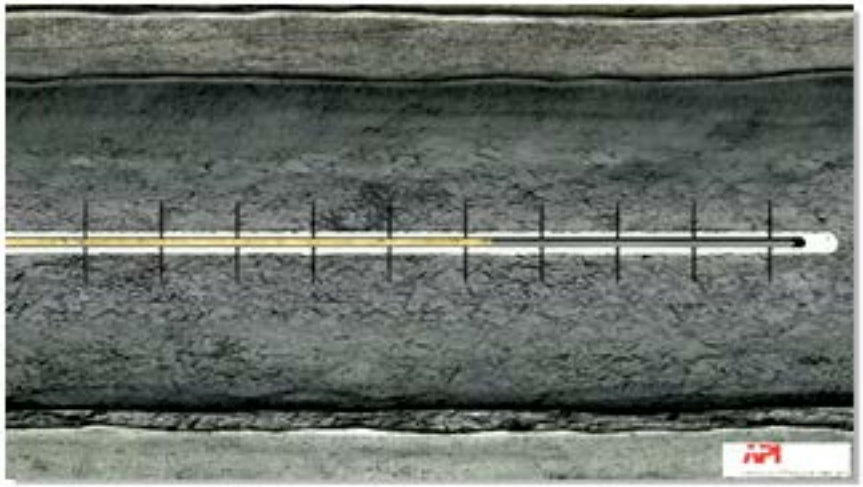
EPA HQ Tribal Consultation on Draft Guidance

- Tribal Webinar during guidance development, June 2, 2011 (presentations and meeting summaries: http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydroout.cfm)
- Notification of National Tribal Water Council and National Tribal Caucus upon release of the draft guidance, May 4, 2012
- Today's webinar
- Repeat of this webinar later this summer, TBD

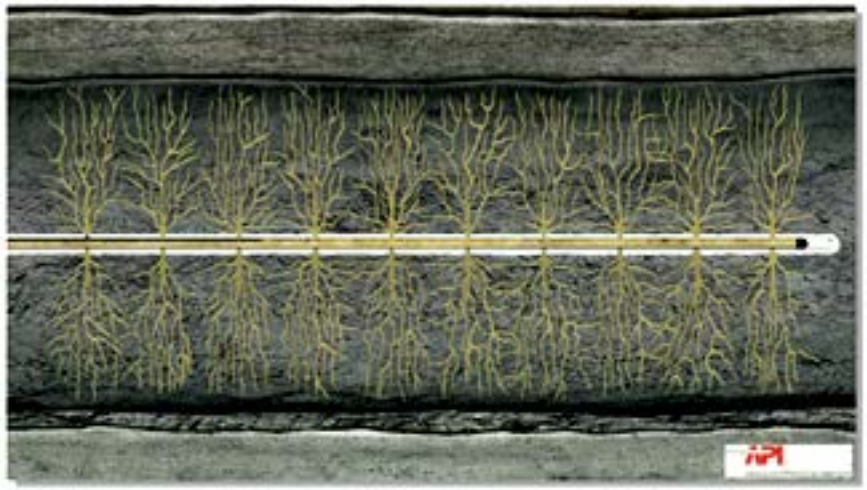
Hydraulic Fracturing (HF)

- Enhances subsurface fracture systems to allow fluid movement to production wells
- Fractures are created when a fluid is pumped down production wells at high pressure for short periods of time (hours)
- The high-pressure fluid exceeds the rock strength and opens fractures in the rock
- A propping agent, usually sand, is pumped into the fractures to keep them from closing when the fracturing pressure is released
- HF is not limited to the oil and gas industry and may be used to enhance subsurface remediation projects and stimulate domestic drinking water wells

Well casing is perforated and HF fluids are injected

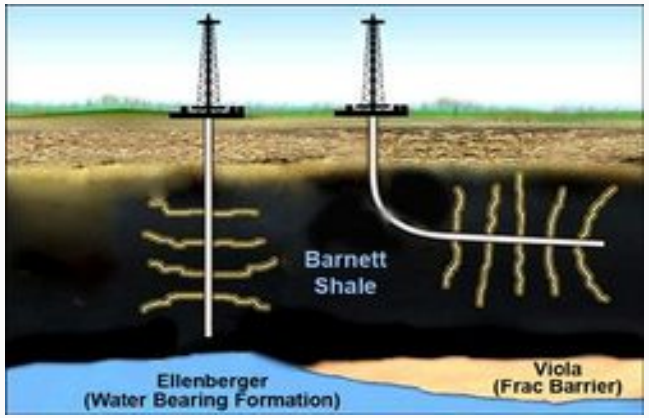


System is pressurized and propping agent is pumped into fractures

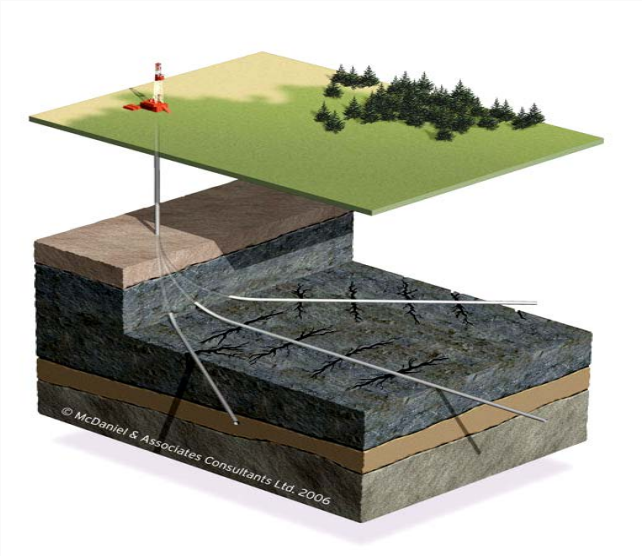


Drilling

- Well drilling may be vertical or horizontal
- Horizontal drilling is a new technology frequently used in less permeable formations (such as shale) to increase production

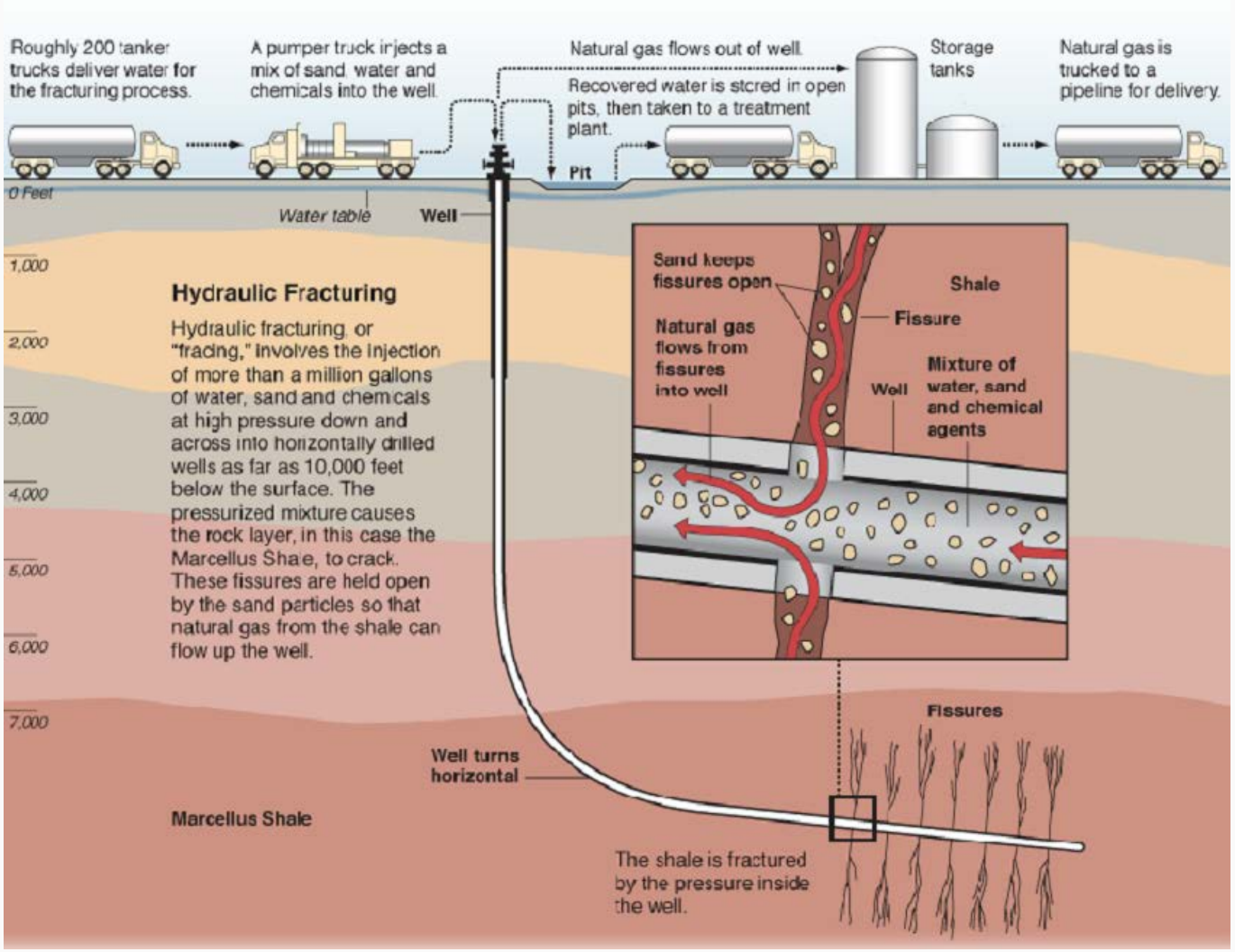


Vertical (left) and horizontal drilling (right) with HF cross-section of well

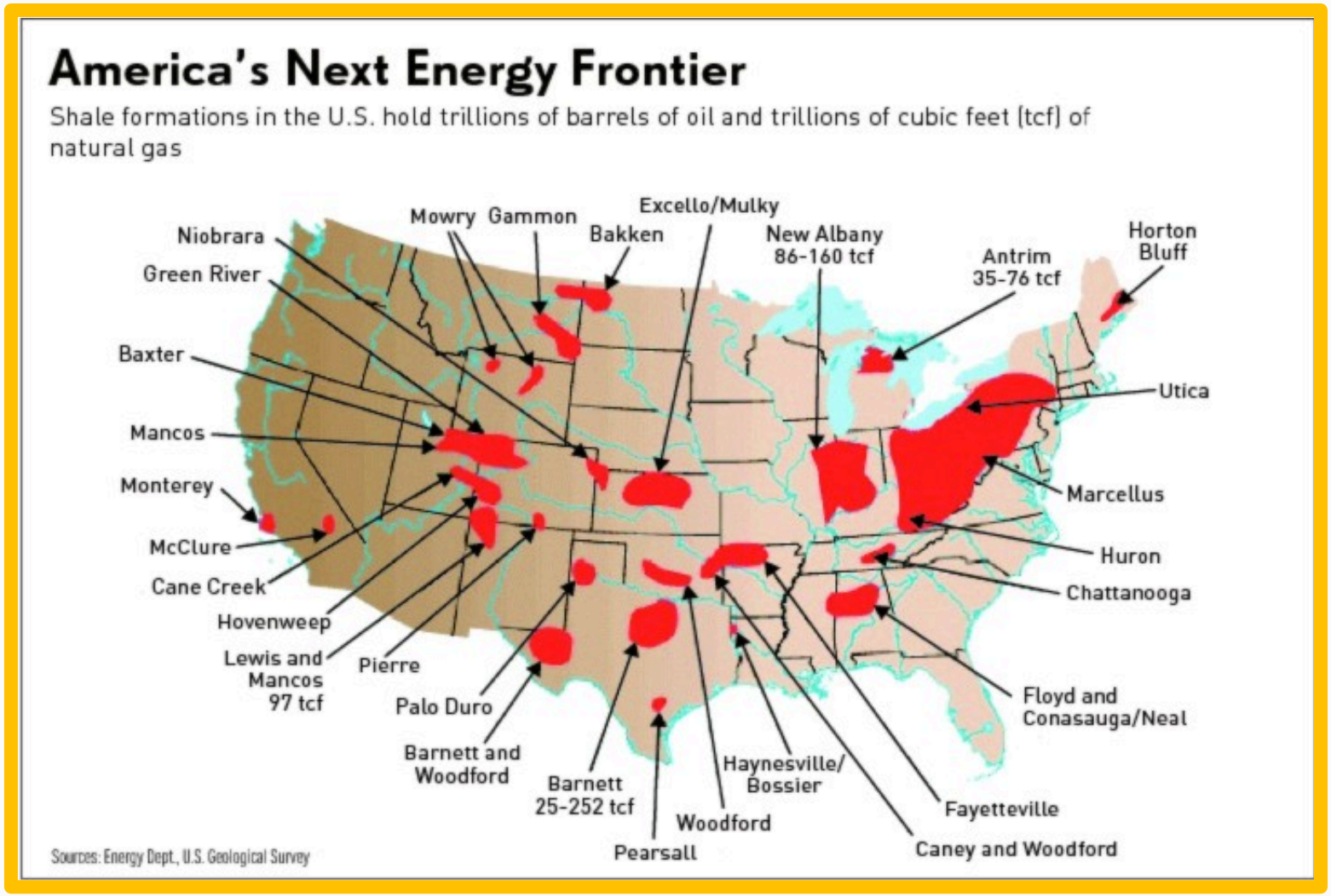


Several wells using horizontal drilling with HF may extend radially into a formation from a central wellpad, unlike wells using vertical HF

Hydraulic Fracturing Schematic



Where is HF Being Utilized?



Safe Drinking Water Act Authorities

- EPA's central authority to protect drinking water is drawn from the Safe Drinking Water Act (SDWA)

- The SDWA requires EPA to develop federal regulations for Underground Injection Control (UIC) Programs to ***prevent endangerment of underground sources of drinking water (USDWs)***

- SDWA § 1431 contains provisions to address imminent and substantial endangerment of USDWs

Class II Injection Wells

Well Class	Function
Class I	Hazardous and non-hazardous industrial and municipal wastes
Class II	Fluids injected related to oil and gas production
Class III	Solution mining (e.g. salt, uranium)
Class IV	Shallow hazardous waste – only used for remediation activities
Class V	Injection wells not included in Class I, II, III, IV, or VI
Class VI	Geologic sequestration of carbon dioxide

- When the UIC program was first established, EPA designated Class II as the category for oil and gas related activities
- A 2001 case before the 11th Circuit Court affirmed that injection of HF fluids is a Class II well

Why are Diesel Fuels a Concern?

- EPA's 2004 study of HF in coalbed methane reservoirs identified diesel fuels as a concern
- Some chemicals included in diesel fuels contain benzene, toluene, ethylbenzene, and xylene compounds (BTEX)
- BTEX compounds are highly mobile in ground water and are regulated under the national primary drinking water regulations
- Consuming water containing BTEX over long periods poses a serious risk to human health and can lead to:
  - Increase in anemia
  - Increased cancer risk
  - Damage to nervous system, kidneys and liver

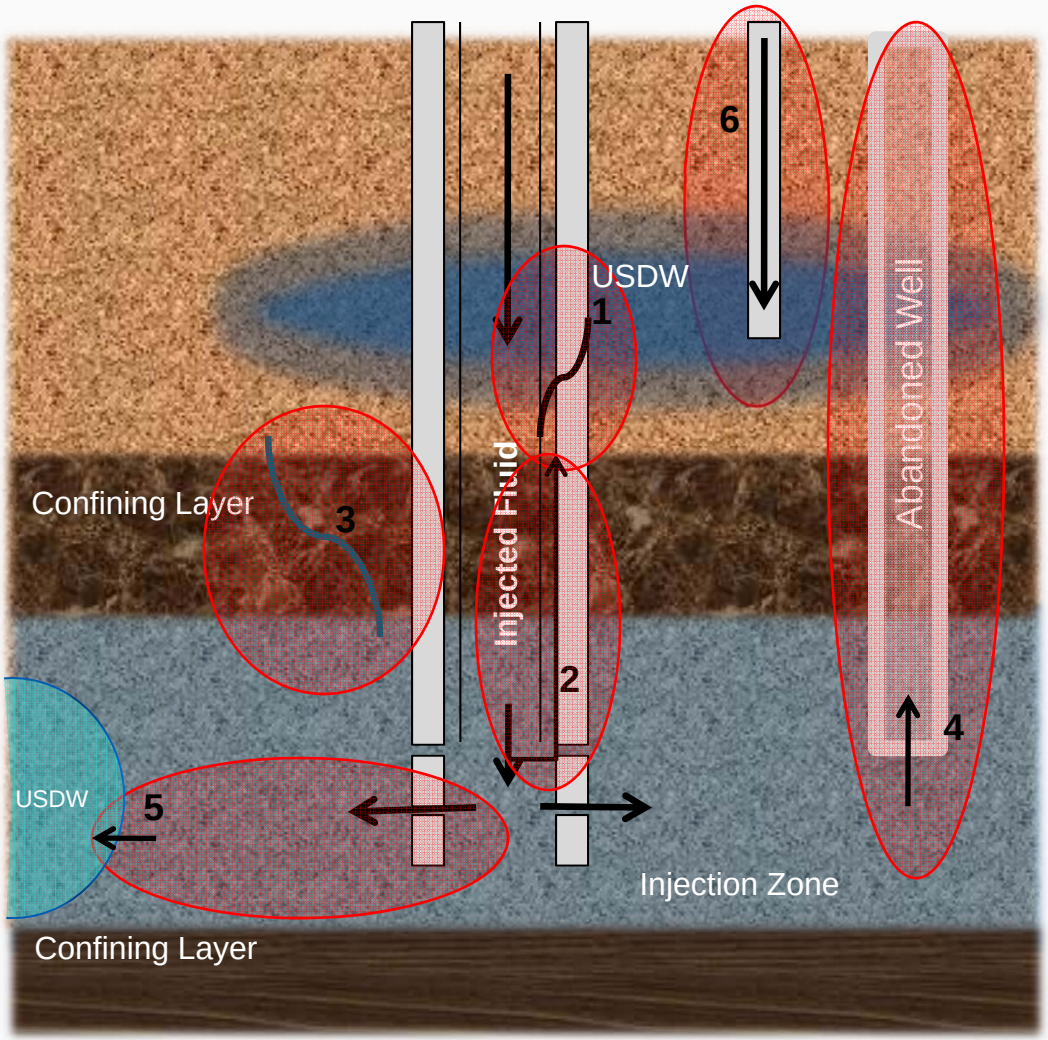
Energy Policy Act of 2005

- SDWA section 1421(d)(1)(B) exempted the injection of fluids or propping agents **(other than diesel fuels)** from the definition of underground injection
  - EPA's 2004 study of hydraulic fracturing (HF) in coalbed methane reservoirs identified diesel fuels as a concern
  - April 2011 Congressional Report found that more than 32.7 million gals of fluids containing diesel fuels were used in HF
  - Provided guidance for permit writers on hydraulic fracturing injection where diesel fuels are used

Preventing Endangerment of USDWs

Potential Fluid Migration Pathways

1. Faulty injection well casing
2. Annulus between casing and the well bore
3. Migration through confining layers from injection zone
4. Vertical migration through improperly abandoned and completed wells
5. Lateral migration from within injection zone into a protected portion of USDW
6. Direct injection of fluids into or above a USDW



Class II Well Requirements

Injection of oil and gas production fluids

Key Protective Requirements:

Construction and Siting

- Cased and cemented to prevent movement of fluids into underground sources of drinking water
- Construction and design of well (casing, tubing, and packer) varies

Monitoring and Testing

- Internal and external mechanical integrity test
- Periodic monitoring and reporting

Area of Review

- ¼ mile radius for abandoned wells or other conduits

Draft Framework for Permitting Oil and Gas Activities Using Diesel Fuels for Hydraulic Fracturing

Special Considerations for Hydraulic Fracturing Using Diesel Fuels:

Intermittent duration, high pressure, long laterals, diesel fuels

UIC Program Components

Guidance for Hydraulic Fracturing Using Diesel Fuels

Purpose of UIC Oil & Gas Guidance

- Describes current Class II oil and gas injection requirements under SDWA and UIC regulations.
- Provides a description of “diesel fuels” for the purposes of UIC Program implementation.
- Provides recommendations to EPA permit writers for tailoring requirements to HF.

Draft Guidance Content

1. UIC Background and Implementation
   - Determination of Class II as appropriate well class
2. Diesel Fuels Description
3. Use of Area Permits
4. Information for Permit Application
5. Area of Review
6. Permit Duration & Well Closure
7. Construction & Mechanical Integrity
8. Operation, Monitoring, & Reporting
9. Financial Responsibility
10. Public Notification

Area Permits

Existing Regulations

- Issue one permit for multiple wells
- Locate wells within same field, facility, site, reservoir, project or similar unit in state
- Issue permit to single owner or operator
- Consider cumulative effects

Recommendation

- Issue a single Class II area permit for multiple wells where all requirements are met

Area of Review (AoR)

Existing Requirements

- The AoR must be determined by one of two methods:
  - Determining the zone of endangering influence (ZEI), or
  - Using a minimum one-quarter (¼) mile fixed radius around the well

Recommendations

- Modify the one-quarter (¼) mile fixed radius approach to delineating the AoR so that it is sufficiently protective of USDWs

Permit Duration & Well Closure

Existing Regulations

UIC Well May Be :

- Permitted as an active injection well for the life of the facility
- Converted out of the UIC Program after injection ceases
- Managed as temporarily abandoned

Recommendation

- Set a shorter permit duration, allow conversion out of the program, or treatment as temporarily abandoned after injection ceases

Operations, Monitoring & Reporting

Existing Regulations

- Establish injection pressure limits to protect confining zone
- Monitor nature of fluids, pressure, flow rate, volume
- Ensure reporting of emergencies, noncompliance, monitoring parameters, maintenance procedures

Recommendations

- Consider construction, geologic conditions, and historical activities when determining injection pressures
- Adjust monitoring & reporting as needed during temporary abandonment
- *Consider microseismic/ tiltmeter monitoring (for comment)*
- *Conduct water quality monitoring of nearby USDWs (for comment)*

Public Notification & Environmental Justice

Existing Requirements

- Give public 30 days to comment on a draft permit and allow for hearing, if requested

Recommendations

- Begin planning for Public Notification early to reduce impact on schedule
- Identify and submit with the permit application the names and addresses of all land owners within one-quarter mile of the facility boundary
- Make a special effort to consider environmental justice in permitting decisions

Developing the Diesel Fuels Description

- Consulted with states, and industry to determine how diesel was used in HF
- Reviewed “diesel fuels” as described in other federal programs, scientific literature, and industry references:
  - Material Safety Data Sheets from different refineries
  - References from Petroleum Refinery Processes
  - Chemical Abstracts Service (CAS) Registry Numbers can be used to identify diesel fuels

Diesel Fuels Description

Six CAS Numbers					
Diesel Fuel / Diesel Fuel No. 1 (68334-30-5)	Diesel Fuel / Diesel Fuel No. 2 (68476-30-2)	Fuel Oil No. 2 / Diesel Fuel (68476-34-6)	Fuel Oil No. 4 / Diesel Fuel No. 4 (68476-31-3)	Kerosene / Marine Diesel Fuel (8008-20-6)	Distillates (Petroleum), Crude Oil / Diesel Fuel (VDF) (68410-00-4)

Note: Guidance does not specify a *de minimis* diesel fuels amount.

Impacts of the Guidance in Indian Country

- EPA will be issuing permits for diesel fuels HF wells under Class II
- Clarity for companies to make informed decisions about the use of diesel fuels
- Improved compliance with the SDWA and strengthened environmental protections
  - Diesel fuels HF wells must be permitted by EPA UIC program
- Tribal governments could choose to ban the use of diesel fuels in HF on their reservations

EPA UIC Program Draft Guidance and Proposed Bureau of Land Management (BLM) Regulation

- Diesel fuels HF operations in Arizona and most BLM-leased Indian lands will require permits from EPA and BLM
- EPA UIC program draft guidance protects underground sources of drinking water
- BLM proposed regulation covers surface and sub-surface activities consistent with federal land policy and leasing statutes using principle of multiple use and sustainable yield

Next Steps

Public Meeting: June 29, 2012 Washington DC:
http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydroout.cfm

* After this webinar was held, EPA extended the public comment period to **August 23**

Submitting Public Comments

Instructions at
http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/hydraulic-fracturing.cfm

Specify Docket ID No. EPA-HQ-OW-2011-1013:

- **Online:** Go to www.regulations.gov, and follow the on-line instructions for submitting comment
- **Email:** OW-Docket@epa.gov
- **Mail:** Permitting Guidance for Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels - Draft, Environmental Protection Agency, Mailcode: 4606M, 1200 Pennsylvania Ave., NW, Washington, DC 20460
- **Hand Delivery:** Office of Water (OW) Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC

Educational Resources

EPA Hydraulic Fracturing Website: http://www.epa.gov/hydraulicfracture/

EPA UIC Website: http://water.epa.gov/type/groundwater/uic/index.cfm

UIC Regulations 40 CFR 144-148: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=d6ee71a544eca89c533c825135913f13&c=ecfr&tpl=/ecfrbrowse/Title40/40cfrv22_02.tpl

USGS Ground Water Contaminant Transport: http://toxics.usgs.gov/topics/gwcontam_transport.html

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Thank You!

Questions????????????