EPA's Approach to Developing Permitting Guidance for Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels

Public Webinar

June 15, 2011

U.S. Environmental Protection Agency
Office of Ground Water and Drinking Water

Today's Presentation

2:00-2:05 - Welcome, Ground Rules

2:05-2:15 - Introduction

2:15-2:45 - Underground Injection Control 101

2:45-3:00 - Guidance Development

3:00-4:00 - Key Issues for Developing Guidance

4:00-4:50 - Questions and Answers

4:50-5:00 - Wrap-up

Ground Rules

- *Please focus on questions*: The purpose of this webinar is to provide information and an opportunity to ask questions. EPA welcomes comments in writing and will accept them for up to two weeks after this webinar.
- *Please be brief*: Help others get a chance to speak by keeping your questions brief.
- *Please be respectful*: Stay focused on the substance and please use appropriate language.

What Is Our Purpose Today?

1. Introduction: To explain what we're doing and why
2. Underground Injection Control 101: To explain EPA's authority and program requirements under the Safe Drinking Water Act
3. Guidance Development: To explain the approach to guidance, key issues, what we heard in past meetings and next steps

Purpose

- EPA is accepting input on approaches to guidance to assist with permitting of hydraulic fracturing using diesel fuels under the Safe Drinking Water Act (SDWA), Underground Injection Control (UIC) Class II regulations
  - SDWA requires a permit
  - Current UIC Class II regulations apply
  - Regulations provide for additional permit conditions as needed

Timeline 2011

Hold Stakeholder Process
- Spring

Develop Draft Guidance
- Summer

Submit to White House Office of Management and Budget for review
- Summer

Hold Public Comment Period
- Fall

Develop Final Guidance

Stakeholder Process

Important Points to Remember about the Guidance Approaches

Based on existing Underground Injection Control Class II program requirements	Focuses on oil and gas hydraulic fracturing using diesel fuels	Recommends approaches for permit writers to consider in writing permits	Cannot set new regulations or change existing regulations

Safe Drinking Water Act

- Mandate to UIC Program
  - Protect underground sources of drinking water (USDW) from endangerment caused by underground injection
- What is an underground source of drinking water?
  - Any aquifer or portion of an aquifer that contains water that is less than 10,000 PPM total dissolved solids or contains a volume of water such that it is a present, or viable future, source for a Public Water System

Introduction

SDWA Requires a Permit for Underground Injection

- Underground injection is the practice of placing fluids underground in porous formations of rock and/or soil, through wells
- 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)
- EPA developed the UIC program regulations to protect underground sources of drinking water during injection

Underground Injection Control Regulations

- Six classes of injection well
- Class II - oil and natural gas-related injection:
  - Wells injecting fluids brought to the surface in connection with natural gas storage, conventional oil or natural gas production;
  - Enhanced recovery of oil or natural gas; and
  - Storage of liquid hydrocarbons
- UIC Class II requirements provide a framework

Why are Diesel Fuels a Concern?

- Diesel fuels are added to hydraulic fracturing fluids as viscosifiers and as solvents to aid in the delivery of gelling agents
- Diesel fuels contain various amounts of constituents that can be hazardous to human health. Among these constituents are benzene, toluene, ethylbenzene, and xylene (BTEX compounds)
- BTEX compounds are highly mobile in ground water and have national primary drinking water regulations associated with them because of the human health risks they pose
- Health Effects: Some people who drink water containing any of these compounds in excess of the maximum contaminant level over many years could experience:
  - An increase in anemia or a decrease in blood platelets from benzene exposure
  - An increased risk of cancer from benzene exposure
  - Problems with the nervous system, kidneys, or liver from toluene exposure
  - Problems with the liver or kidneys from ethylbenzene exposure
  - Damage to the nervous system from exposure to xylenes

Summary

- Congress directed EPA to regulate diesel fuels hydraulic fracturing under the Safe Drinking Water Act Underground Injection Control Program
- EPA is working with stakeholders to gather information to assist permit writers

Underground Injection Control 101

KEY UIC CONCEPTS

- Underground Injection Control Basics
- Preventing Endangerment to Underground Sources of Drinking Water
- Potential Fluid Migration Pathways
- Well Classification
- Permitting Requirements

Safe Drinking Water Act

- Authorizes EPA to develop minimum federal regulations for state and tribal Underground Injection Control (UIC) programs to protect underground sources of drinking water
- Mandates EPA to regulate underground injection of *all* fluids – liquid, gas, or slurry
- Establishes a process for approving primary enforcement authority for states and tribes
- Authorizes EPA to provide grants to states and tribes in support of essential UIC program functions
- Provides states with flexibility to establish effective Class II (oil and gas) programs

What is Underground Injection?

- ***Underground injection is the practice of placing fluids underground,*** in porous formations of rock and/or soil, through wells
- ***Well - A bored, drilled, or driven shaft, or a dug well or dug hole where the*** depth is greater than the largest surface dimension; OR an improved sinkhole; OR a subsurface distribution system
- Injection wells are used to dispose of industrial wastewaters, stormwater, hazardous waste, and to place drinking water in formations for storage and future use

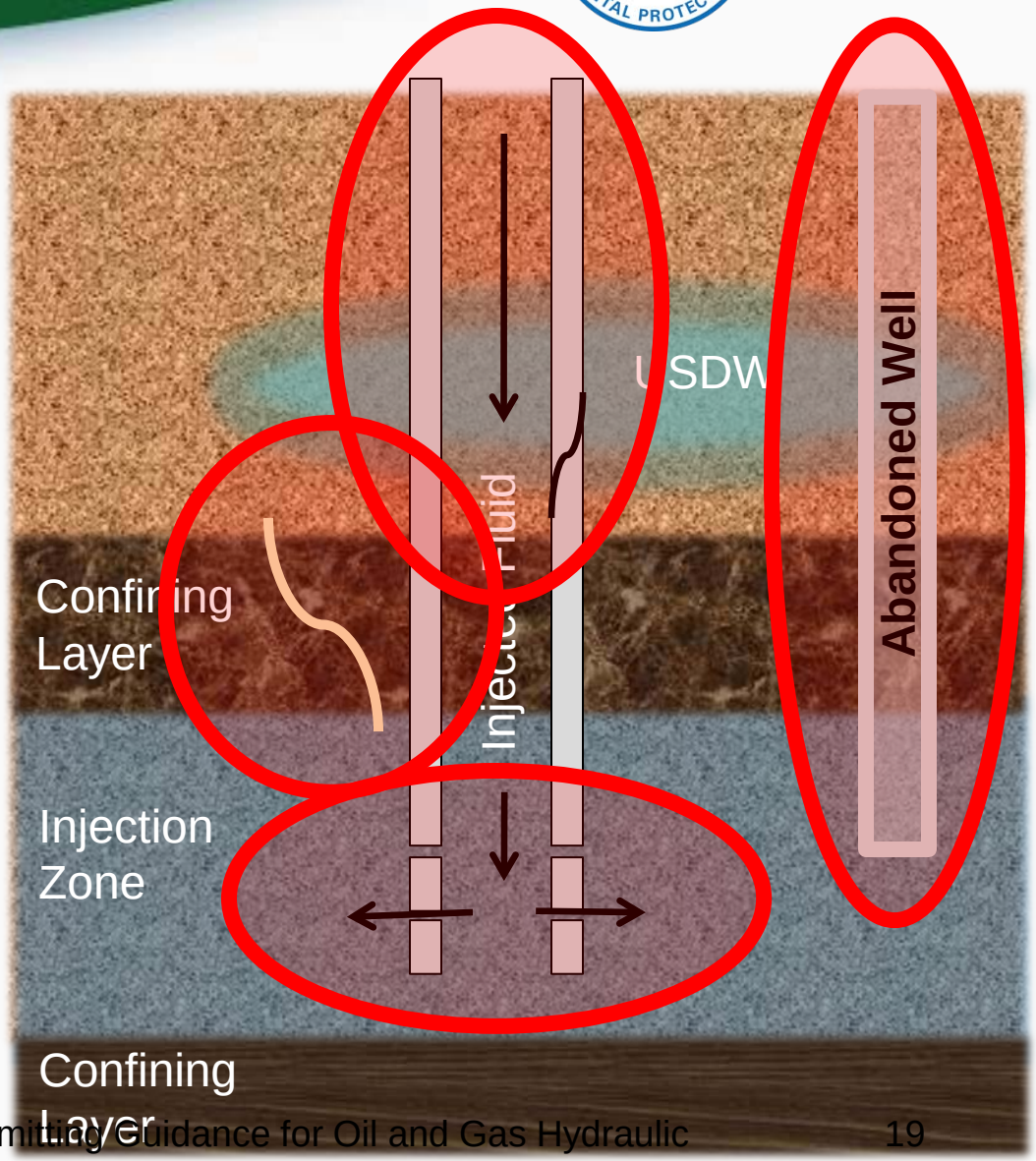
Preventing Endangerment

- Underground injection endangers underground sources of drinking water if such injection
  - may result in the presence in underground water that supplies, or can be reasonably expected to supply, any public water system of any contaminant, and
  - if the presence of such contaminant may result in such system not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons. (SDWA 1421)

UIC 101 – Preventing Endangerment

Potential Fluid Migration Pathways

1. Faulty injection well casing
2. Annulus between casing and wellbore
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



UIC Well Classification

Well Class	Function	Inventory
Class I	Hazardous industrial and municipal wastes	650
Class II	**Fluids related to oil and gas production**	**151,000**
Class III	Solution mining (e.g. salt, uranium)	21,400
Class IV	Shallow hazardous waste – only used for remediation activities	24 sites
Class V	Shallow injection of nonhazardous fluids	500,000 – 650,000 (Estimate – precise inventory is unknown)
Class VI	Geologic sequestration of carbon dioxide	N/A

Underground Injection Control Permitting Program Components

- Site Characterization
- Injection Well Construction
- Area of Review
- Operating and Monitoring
- Mechanical Integrity Testing
- Injection Well Closure
- Financial Responsibility
- Public Participation

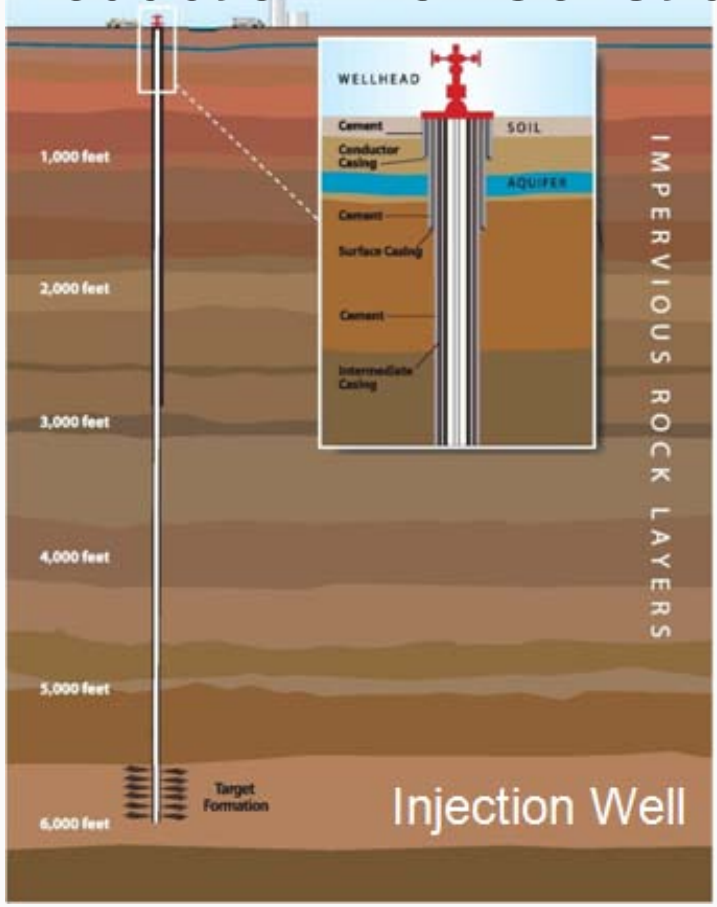
Site Characterization

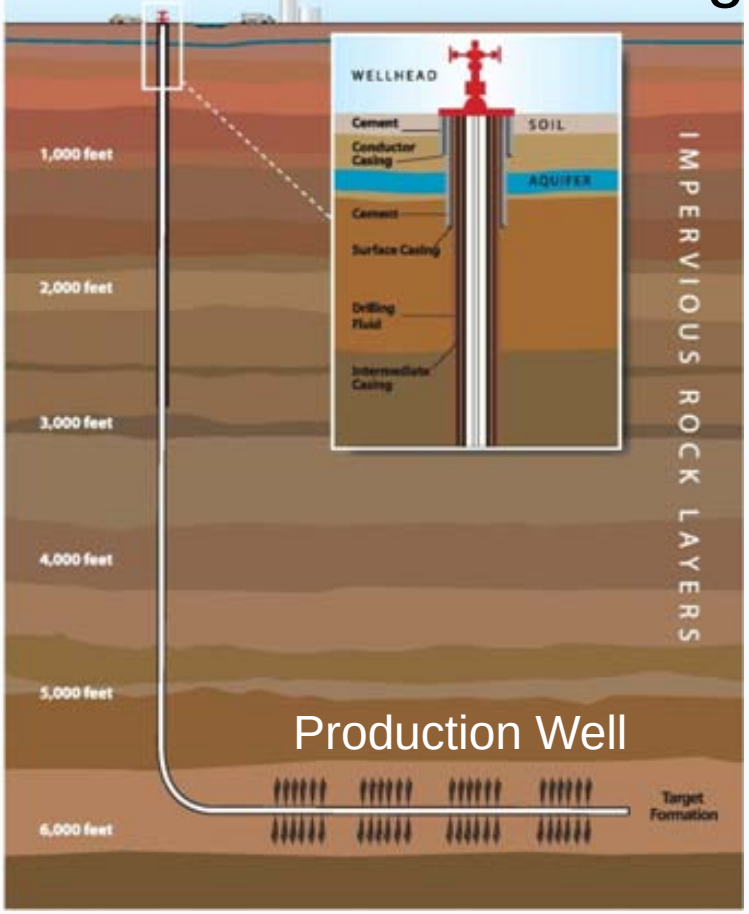
- Permits take into account
  - Descriptive data on injection and confining zones
  - Local and regional geologic maps and cross sections
  - Well logs and tests
  - Geomechanical data
- Operators submit this data with permit applications; permitting authorities review to ensure that injection does not endanger underground sources of drinking water
- The purpose of this evaluation is to address potential migration via faults and fractures or lateral fluid displacement

Injection Well Construction

- Each injection well component protects underground sources of drinking water by preventing migration of fluids from injection zone to USDWs along the borehole
- Multi-layer design: pipe-within-a-pipe
- Well materials and cements should be compatible with the injectate
- Some wells have sophisticated metallurgy and cements

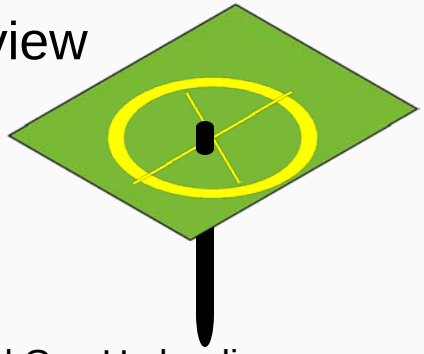
Typical Injection Well Construction and Production Well Construction With Horizontal Drilling





Area of Review

- Area surrounding an injection well that may be affected by the injection activity
- May be determined by
  - Fixed radius (around injection well)
  - Mathematical modeling to determine the Zone of Endangering Influence
- Operators must submit maps of the area of review with the permit application showing:
  - Location of all wells, faults, mines/quarries, and surface features (e.g. roads and residences)
- Corrective action options within the area of review
  - Monitoring in the injection interval
  - Remedial cementing
  - Plugging or re-plugging
  - Reduce injection pressure



Operation & Monitoring

- Requirements vary according to well class, examples are
- Limits on injection pressure to prevent:
  - Initiation of new fractures or propagating existing fractures in the injection zone or confining zone
  - Causation of movement of injection or formation fluids into underground sources of drinking water
  - Generation of significant seismic activity (earthquakes) that would endanger underground sources of drinking water
- Continuous pressure monitoring
- Automatic shut-off devices to stop injection at established limits, or to prevent flow from injection zone

(continued)

Operation & Monitoring

- Monitoring and Testing may also include
  - Injectate monitoring
  - Ground water monitoring
  - Mechanical Integrity Tests (MITs)
- Operators report the results to the permitting authority on a regular basis specified in regulations or the permit
- Monitoring Injectate

(continued)

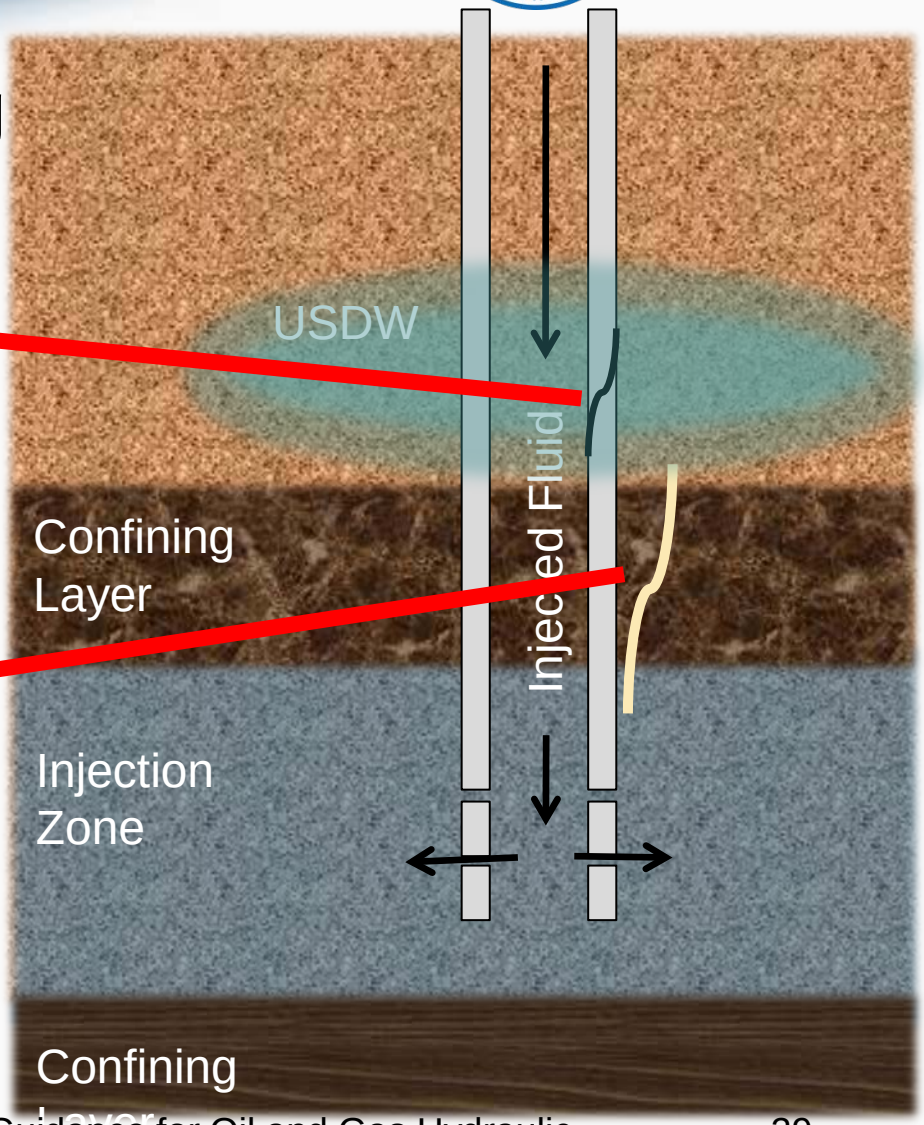
Operation & Monitoring

- Ground Water Monitoring
  - Provides early warning of unauthorized or unanticipated fluid movement
  - Potential locations
    - Within the injection zone
    - Above and below the confining zone(s)
    - Within underground sources of drinking water

UIC 101 – Technical Requirements

Mechanical Integrity Testing

- Internal: to demonstrate no significant leak in the casing, tubing, or packer
- External: to demonstrate no significant fluid movement into underground source of drinking water through channels adjacent to injection well bore



Injection Well Closure

- Proper closure care and monitoring assures that the well will not be a conduit for future fluid movement
- Plug with cement
- Conduct post-closure monitoring
- Up front, a well owner/operator must demonstrate financial responsibility – in other words, have adequate resources to close the well

Financial Responsibility

- Demonstration of financial responsibility is a permit condition required until
  - The well is plugged and abandoned in accordance with an approved plugging and abandonment plan,
  - The well is converted from an injection well to a production well, or
  - The permit is transferred to a new permittee
- In the case of a permit transfer, the original permittee must continue to demonstrate financial responsibility until the new permittee also demonstrates financial responsibility
- Permittees must submit surety bonds or provide other adequate assurance, such as a financial statement or other materials acceptable to the UIC director

Public Participation

- UIC Director must give notice to the public of permit actions
  - when a permit has been tentatively denied
  - a draft permit has been prepared
  - a hearing has been scheduled
  - or an appeal has been granted
- The public must be given 30 days to comment on a draft permit and 30 days notice of a planned hearing
- During the 30 day comment period for a draft permit, any interested person may request a hearing.

More Information about the UIC Program

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

Code of Federal Regulations: Underground Injection Control Regulations 40 CFR 144-148:
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=d6ee71a544eca89c533c825135913f13&c=ecfr&tpl=/ecfrbrowse/Title40/40cfrv22_02.tpl

Guidance Development

Permitting of Oil and Gas Activities Using Diesel Fuels for Hydraulic Fracturing

Goals of Diesel Fuels Hydraulic Fracturing Guidance

- UIC programs must issue permits for hydraulic fracturing using diesel
- Guidance objectives
  - describe unique issues when permitting diesel hydraulic fracturing as Class II
  - increase consistency of program implementation
  - streamline coordination with state and tribal oil & gas agencies
  - clarify permit expectations for well owner/operators

Program 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

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

Guidance for Hydraulic Fracturing Using Diesel Fuels

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

Underground Injection Control 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…
- 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.

Class II Well Requirements

Injection of oil and gas production fluids

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

Recordkeeping and Reporting

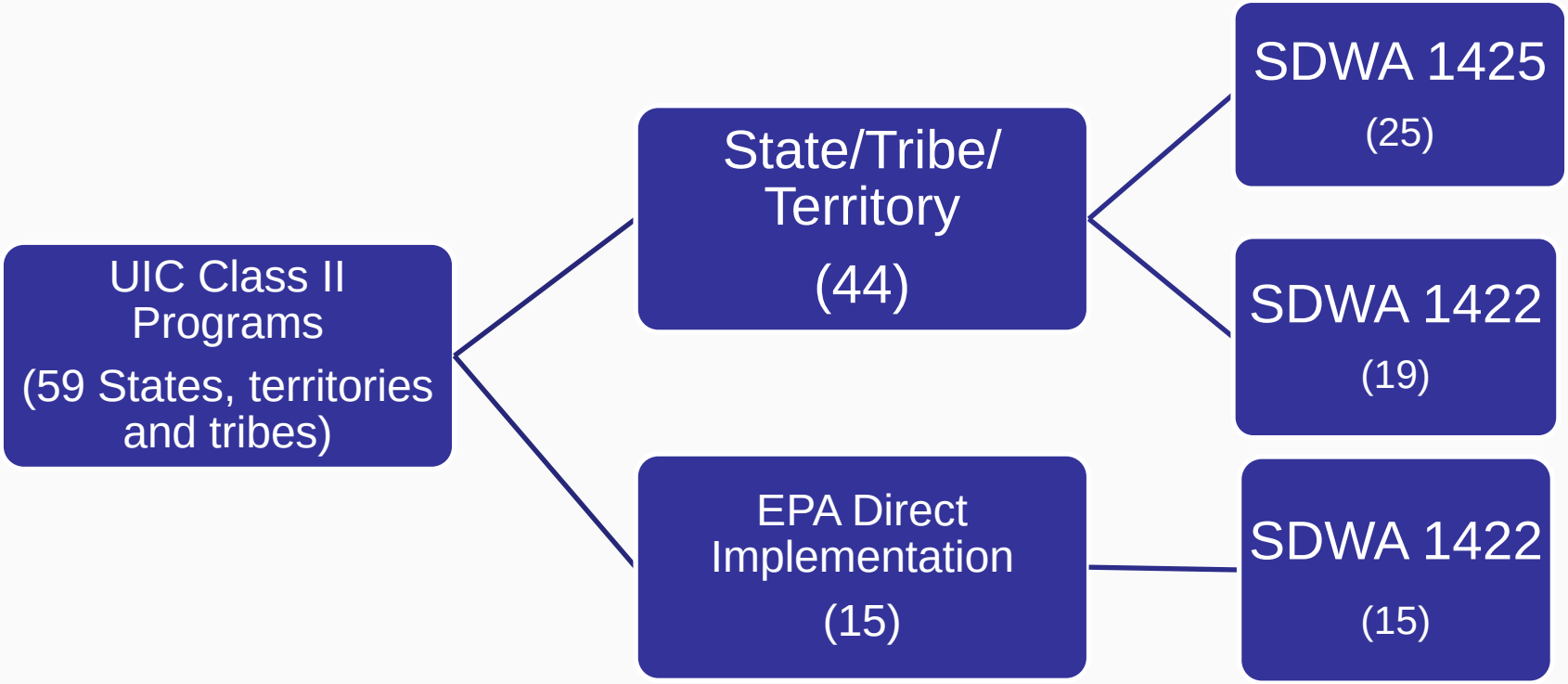
- Plan for safe plugging and abandoning of wells

UIC Class II Implementation Considerations

SDWA and the UIC regulations provide for the following implementation methods:

- State implementation
  - **SDWA Section 1422** requires states to meet EPA's minimum requirements for UIC programs.
  - **SDWA Section 1425** allows states to demonstrate that their existing standards are *effective* in preventing endangerment of USDWs.
- Direct implementation by the EPA (Section 1422)

Class II Implementing Agencies



Key Issues for Developing Guidance

- What should be considered as “diesel fuels”?
- What public notification requirements or special environmental justice considerations should be considered for authorization of wells using diesel fuels for hydraulic fracturing?
- What are important siting considerations for hydraulic fracturing wells using diesel fuels?
- What suggestions do you have for reviewing the area around a hydraulic fracturing well using diesel fuels to ensure there are no conduits for fluid migration?
- What well construction requirements should apply to hydraulic fracturing wells using diesel fuels?
- What well operation and mechanical integrity requirements should apply to diesel fuels hydraulic fracturing wells?
- What monitoring and reporting requirements should apply to diesel fuels hydraulic fracturing wells?
- What should the permit duration be, considering the intermittent nature of diesel fuels hydraulic fracturing and Class II plugging and abandonment provisions?
- What are alternatives for authorizing/permitting Class II wells using diesel fuels for hydraulic fracturing?
- What information should be submitted with the diesel fuels hydraulic fracturing permit application?
- What should the time frame be for submitting a Class II diesel fuels hydraulic fracturing permit?
- How do the Class II financial responsibility requirements apply to wells using diesel fuels for hydraulic fracturing?

Key Issues for Developing Guidance

What should be considered as "diesel fuels"?

Potential Approaches	Stakeholder Input
• ASTM Standard Specification for Diesel Fuel Oils, D975–91* (ASTM International was formerly known as the American Society for Testing and Materials) • Petroleum-derived fuel that could be used in a diesel engine • Any amount of diesel fuel (whether mixed with or applied to other constituents being injected)	•**Identification of diesel** • Chemical Abstract Service Registry Numbers • ASTM Standard • Office of Air definition: any fuel sold in the US suitable for diesel engines (biodiesel included) • Anything that can be used in a diesel engine • All hydrocarbon-based components • Petroleum products from which diesel could be extracted • **Threshold** • 1% or 10% of total fracturing fluid volume • If diesel is used as a carrier fluid it's included • No de minimus

*The ASTM standard explains what tests to use to identify "diesel fuel." The particular properties that define diesel fuel are determined based on a series of tests, such as boiling range, volatility, cetane number (a measure of combustion quality), viscosity, carbon residue, sulfur, copper strip corrosion, and others. The series of tests are designed to describe the appropriateness of use in a diesel engine. If the fluid falls within the given range of values for the tests cited, it is considered to be diesel fuel.

Key Issues for Developing Guidance

What public notification requirements or special environmental justice considerations should be considered for authorization of hydraulic fracturing wells using diesel fuels?

Potential Approaches	Stakeholder Input

• Provide 30-day public notice of a pending permitting action via newspapers, postings, and mailings and in some cases a public hearing
• Provide opportunity for public input if requested (30 days)
	• **Length of time:**
	  • Suggested varying public notification periods – 15, 20, 30 and more than 30 days prior to drilling
	  • Rely on existing state requirements and provide flexibility for states
	• **Notice to Whom**: Notify state drinking water programs, public water systems in the area of review / along the laterals, and neighboring landowners in addition to mineral resource owners.
	• **Alternatives:**
	  • Hold field hearing for permit by rule of a field or notice once for an area permit
	  • Require government (e.g., state agency) oversight of notification
	  • Could save time by allowing notice period concurrent with period that owner/operator is contracting with service company
	  • Environmental justice considerations may not be appropriate since well locations are dependent on resource

Key Issues for Developing Guidance

What are important siting considerations for hydraulic fracturing wells using diesel fuels ?

Potential Approaches

- Determine integrity of **confining layers** surrounding target injection zone (e.g., porosity, permeability, rock strength)
- Determine integrity of the **injection zone** to withstand proposed injection operation activities (e.g., fracture pressures)
- Evaluate project area to identify **existing fault or fracture patterns** to confirm that they will not compromise the confining layers or result in endangerment of USDWs during hydraulic fracturing events
- Demonstrate that proposed hydraulic fracturing events will not endanger USDWs within the project area

Stakeholder Input

- Several stakeholders agreed that injection zone and confining layer integrity, and existing fault or fracture patterns determinations are important
- Require microseismic monitoring and consideration of fracture gradients within the confining zone
- Consider performance-based / tiered approach (along with monitoring)
- Examine cumulative impacts on confining zone
- Identify abandoned wells within a half mile (or farther)
- Require independent evaluation of the geology, hydrology, etc.
- Recommend prohibition of injecting diesel fuels into USDWs (e.g., in coal-bed methane reservoirs)

Key Issues for Developing Guidance

What suggestions do you have for reviewing the area around a hydraulic fracturing well using diesel fuels to ensure there are no conduits for fluid migration?

Potential Approaches

- Delineate the area of review:
  - using a fixed, ¼ mile radius around the wellbore, or
  - by calculating the zone of endangering influence
- Identify all artificial penetrations and evaluate features that may allow upward migration
- Determine if artificial penetrations and geologic features provide an adequate seal
- Remediate (corrective action) if possible

Stakeholder Input

- **Area of Review Extent:**
  - Area of review should consider both vertical and lateral extent of wells
  - Use ¼-mile radius from wellhead and any lateral extent (Ellipse approach)
  - Use ½ mile radius or larger
  - Use Class I requirements
  - Calculate zone of endangering influence or use modeling, not a fixed radius – a performance based standard
- **Alternatives:**
  - Look at overlap between area of review and state production regulations (location of aquifers and water well depths)
  - Use tiered approach based on potential risk to the underground source of drinking water
  - Consider whether well is in a source protection zone
- **Additional Consideration:** Add “major fractures” to considerations

Key Issues for Developing Guidance

What well construction requirements should apply to hydraulic fracturing wells using diesel fuels?

Potential Approaches

- Cased and cemented to prevent movement of fluids into or between the underground source of drinking water
- Construction materials designed for the life expectancy of the well
- Extend surface casing and cement through the base of the lowermost underground source of drinking water
- Add requirements for wells adjacent to protected water supplies or other close proximity wells

Stakeholder Input

- Rely on state requirements or review state standards (e.g., states require cementing through or below underground source of drinking water/aquifer, etc.)
- Extend surface casing a certain distance (e.g., 100 feet per American Petroleum Institute's standard) below base of lowermost underground source of drinking water
- Use mud logging to determine appropriate depth – don't rely on a set number
- Set casing cement upward from the production zone into a competent geologic formation
- Cement bond log could be used to verify good bonding between casing and the formation
- Identify how to isolate private water wells in area of review
- Consider characteristics of injected fluids (for compatibility with well materials)

Key Issues for Developing Guidance

What well operation and mechanical integrity requirements should apply to diesel fuels hydraulic fracturing wells?

Potential Approaches

•No significant leak in the casing
•No significant fluid movement into underground sources of drinking water through vertical channels adjacent to the injection well bore
•Testing at least once every five years
•Conduct pressure testing prior to hydraulic fracturing to demonstrate well integrity
•Conduct mechanical integrity testing: before and after hydraulic fracturing events (using diesel fuels) and/or during an hydraulic fracturing event (using diesel fuels), conduct pressure monitoring?
•Use blow-out preventers

Stakeholder Input

- **Mechanical Integrity Testing:**
  - For existing wells, demonstrate both internal and external requirements and for external, run a cement bond log
  - Conduct mechanical integrity testing before hydraulic fracturing events, only
  - If loss of circulation during drilling, do additional testing
- **Pressure Test:**
  - Pressure test casing prior to each hydraulic fracturing event
  - Conduct continuous pressure monitoring
  - Conduct pressure testing prior to refracturing
- **Blow-Out Preventers:** Test equipment periodically ultrasonically; blowout preventers could lead to a “false sense of security”

Key Issues for Developing Guidance

What monitoring and reporting requirements should apply to diesel fuels hydraulic fracturing wells?

Potential Approaches

•Conduct logging, sampling, and testing to assess the injection and confining zones: During drilling and construction

•Monitor the nature of the injected fluids: At a frequency sufficient to yield data representative of the fluid characteristics

•Monitor injection pressure, flow rate, and cumulative volume: At least monthly

•Conduct baseline sampling of underground sources of drinking water (and other formations) within the project area

Stakeholder Input

- **General:**
  - Consider that hydraulic fracturing is a short-term operation; place it in the context of what operators already do for producing wells (injection pressures, flow rates, cumulative volume)
  - Monitor for diesel fuels, only
  - Monthly monitoring & reporting is/is not appropriate
- **Add:**
  - Conduct radial bond log
  - Monitor injectate and flow rate throughout hydraulic fracturing
  - Require disclosure of chemicals (with diesel)
  - Monitor fracture growth (e.g., microseismic)
- **Baseline monitoring:**
  - Consider a voluntary approach coupled with assumed liability similar to PA (but considering horizontal wells)
  - Conduct baseline sampling (including injections and confining zones) and sampling of hydrocarbons
  - Not a requirement under Class II so not appropriate

Key Issues for Developing Guidance

What should the permit duration be, considering the intermittent nature of diesel fuels hydraulic fracturing and Class II plugging and abandonment provisions?

Potential Approaches	Stakeholder Input

• For the operating life of the facility
• For the duration of the fracturing activity
• Manage the well as temporarily abandoned or inactive during periods of production (when no injection is occurring), while ensuring that:
  • Hydraulic fracturing activities using diesel fuels are operated and monitored
  • Reporting, monitoring, and mechanical integrity testing are conducted throughout the life of the well
	• Use sliding scale for permit duration based on site-specific conditions
	• Permit duration should be for the duration of the fracturing activity, only
	• Conduct integrity test during shut-in
	• Review permit every 5 years (at Director's discretion)
	• Defer to states' abandonment & plugging requirements to fulfill UIC requirements
	• Manage the well as temporarily abandoned/ inactive approach during production
	  • Then, require approval for re-stimulation but no re-permitting

Key Issues for Developing Guidance

What are alternatives for authorizing/permitting Class II wells using diesel fuels for hydraulic fracturing?

Potential Approaches	Stakeholder Input

• Area permits
• Individual permits
	• Consider permit by rule
	  • Field rules and hearings – additional criteria and requirements in fields
	• Support area permits
	  • Area permits for multiple operators
	• Consider regional general permits similar to Army Corps of Engineers
	• Support individual permit based on certification of wellbore and frac job conditions; do not use area permits

Key Issues for Developing Guidance

What information should be submitted with the diesel fuels hydraulic fracturing permit application?

Potential Approaches

- Maps and cross sections of project area/ area of review showing fracture network
- All known wells in area of review that penetrate formations affected by increased pressure
- Data on injection and confining zones
- Results of logging and testing conducted during well siting (or prior to permit application development)
- Well schematics
- Casing and cementing program with pressure tests (for new wells)
- Operating data and proposed fracturing and injection procedure
- Chemical and physical characteristics of injection fluid
- Submit baseline sampling of underground sources of drinking water (and other formations) within the project area

Stakeholder Input

- Set criteria with which operators must comply, with minimum information to be submitted to the Agency
- Consider location of water supply wells in area of review and surface activities
- Consider multiple operators within a formation or an area (cumulative impact)
- Include information about previous problems encountered while drilling
- Include information on surface storage of diesel (this may be regulated under state oil and gas programs or other regulations)
- Integrate with current state Application for Permit to Drill requirements

Key Issues for Developing Guidance

What should the time frame be for submitting a Class II diesel fuels hydraulic fracturing permit?

Potential Approaches	Stakeholder Input
• Allow UIC Director to determine • 30 days prior to activity	• Some states require notification of local landowners – allow time for that notification • 30, 60 and 90 day minimums suggested • Allow states more flexibility to fit with production permitting time frames and other requirements – no minimum

Key Issues for Developing Guidance

How do the Class II financial responsibility requirements apply to wells using diesel fuels for hydraulic fracturing?

Potential Approaches

- Owner or operator must demonstrate and maintain financial assurance (trust fund, bond, or other approved mechanisms) to close and abandon the injection operation
- Accept oil and gas financial security demonstration as UIC financial responsibility

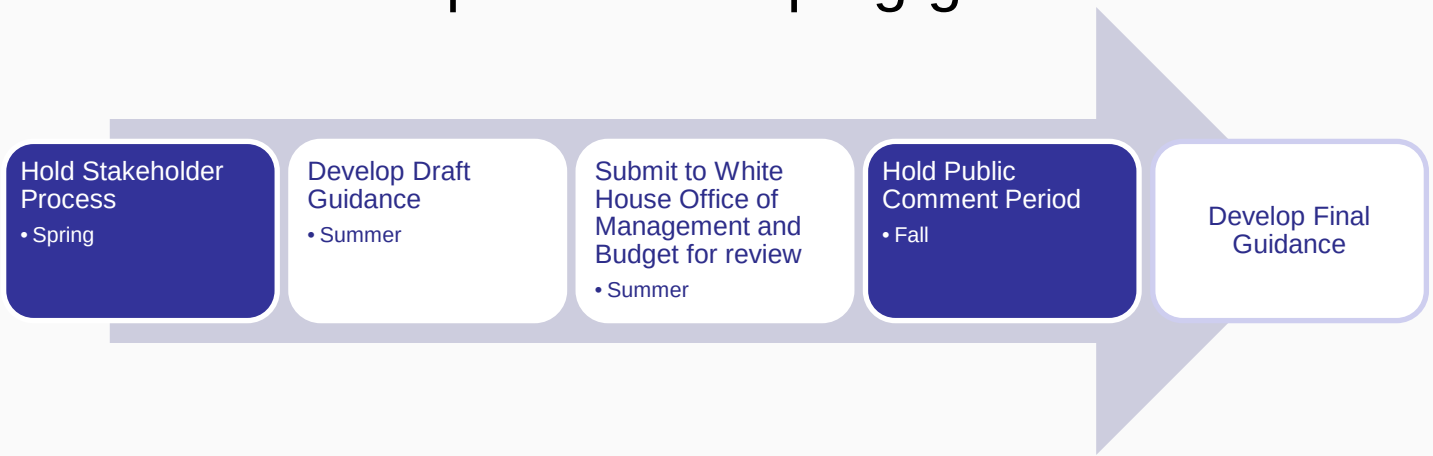
Stakeholder Input

- Use the second option of relying on existing state requirements
- Use Bond approach similar to the Bureau of Land Management
- Bonding for surface owners whose wells may be impacted (remediation)
- Consider the possibility of having a third-party perform plugging /abandonment

Question and Answer Session

Wrap Up

- EPA's next steps in developing guidance



- Please send us your ideas on guidance development by June 29. Email hydraulic.fracturing@epa.gov with "Diesel Fuels Guidance Comments" in the subject line

- For more information about hydraulic fracturing in the UIC Program please visit the following website: http://epa.gov/hydraulicfracturing