Update on EPA Draft Guidance for Permitting Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels

Ron Bergman
Chief, Prevention Branch
Office of Ground Water and Drinking Water
Draft HF Permitting Guidance

- Purpose: to clarify how companies can comply with the Energy Policy Act amendment to the Safe Drinking Water Act
  - Permits are required where diesel fuel is used in HF
  - Provides a description of diesel fuels
- Outlines for EPA permit writers, where EPA is the permitting authority:
  - Class II requirements for HF wells where diesel fuel is used
  - Technical recommendations based on special characteristics of HF
- Makes recommendations that build on best practices from industry and state oil and gas programs
- Companion document includes questions for public comment
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
Draft Guidance Content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
10. Public Notification
Questions For Comment

- *Federal* Register notice includes questions for comment on guidance areas:
  - Diesel Fuels Description
  - Diesel Fuels Usage Information
  - Permit Duration and Well Closure
  - Area of Review
  - Information submitted with the Permit Application
  - Monitoring
Guidance Commenter Summary

Docket: EPA-HQ-OW-2011-1013

Comment Period: 105 days
May 9, 2012 – August 23, 2012

Total letters submitted: 97,147
Total unique letters: 2,734

Private Citizens: 2584
Environmental NGOs: 19
O&G Industry: 86
Water Industry Associations: 5
State Gov’t Agency: 10
Tribal Gov’t Agency: 4
Congress: 3

*Note: multiple signatories on some letters
Rulemaking and Appropriateness of Class II

90 letters commented on the need for rulemaking

- Because EPA has promulgated regulation through guidance and Class II requirements are not suitable for hydraulic fracturing
- To promote consistency across states in protection and power of enforcement
- To make guidance recommendations binding and address state deficiencies
- To respond to special characteristics of hydraulic fracturing
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

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Diesel Fuels Description and *De Minimis* Threshold

- Proposed description based on name, physical and chemical properties, and the ability to run a diesel engine.
- 400 commenters suggested an alternative description
  - Static two CAS # description based on primary name (Diesel 1 and 2)
  - Static three CAS # description based on commonly understood industry usage (Diesel 1 and 2 and Fuel Oil No.2)
  - Dynamic BTEX/chemical properties description based on risk to USDWs
  - Various references to “congressional intent”
- Env NGOs and most Water Associations against a *de minimis*
  - For drinking water systems any detectable quantities trigger treatment requirements under NPDWRs
  - SDWA Maximum Contaminant Level Goal is zero for BTEX
- 30 commenters suggested using a *de minimis*
  - 10% or 1% of total fluid volume
  - 1% of total added chemical mass (similar to MSDS)
Permit Application Requirements

• Congressional and vast majority of individual commenters did not address application requirements
• Env NGOs/Water Associations supportive of EPA’s guidance recommendations
  – Concern over induced seismicity
  – Support less limitation on information required
• Industry commenters view the recommendations as excessive and burdensome and result in permit delays
  – Expansion of data requirements should be done through rulemaking
  – Monitoring wells could create a pathway for contaminants
  – State permit requirements are adequate and seismic data unnecessary
• State regulators believe the recommended data requirements are unjustified
  – Not commonly used in UIC program or O&G production wells
  – May not be needed to evaluate risk to USDWs
Area of Review (AoR)

- Guidance: Modify the ¼ mile radius around the well head to account for horizontal wells or consider numerical models
- Few comments received
- Some assert that the recommended AoR is incorrect based on the practice of hydraulic fracturing
  - Class II AoR is based on long-term injection and contaminant travel
  - AoR should be flexible based on fracture length
  - HF occurs often at great depth below the surface and fractures only extend a few hundred feet posing no threat to USDWs
  - Fracture network is designed to remain within the target zone
  - Numerical models are costly to create and review
- Others believe that Class II AoR regs are insufficient and support additional AoR requirements
  - ¼ mile radius is too small, favor 2,500 foot radius
  - A single AoR around a project with multiple wells would ensure protection of USDWs
  - AoR must be delineated over the length of the well bore
Well Construction

- Draft HF Guidance: surface casing and cement extend through the base of the lowermost USDW and review additional information
  - Ensure the zonal isolation that protects USDWs from fluid migration along the wellbore
- O&G Industry and State Regulators do not support recommendations
  - Existing state well construction regulations provide adequate safeguards
  - Surface casing and cementing through all USDWs not always necessary or feasible
- Env NGOs support the addition of more requirements
  - Require use of proper casing
  - Require appropriately located centralizers that ensure a uniform cement sheath
  - Require surface casing 100 feet below deepest USDW
Mechanical Integrity Testing (MITs)

- Draft HF Guidance: conduct internal and external MITs before the first stimulation and again after completing all stages of hydraulically fracturing a well
  - Well integrity must be maintained at all times while in the UIC program
- O&G Industry and State Regulators assert that recommended MITs are duplicative and inappropriate given well construction
  - State permit requirements are adequate
  - HF wells do not use typical tubing or packer arrangements
  - Post HF MIT is unnecessary because the well is no longer subjected to high pressures after HF and during production
- Env NGOs
  - Consider the BLM draft regs for MIT: pressure holds for 30 min. with no more than 10% loss
  - Automatic operations shut down if MIT is lost or injection pressure exceeds fracture pressure of confining zone during HF
Public Notification

- 40 CFR 124 lists PN requirements for the UIC program.
  - Public notice is a fundamental part of SDWA
- O&G industry/State regulators believe the PN requirements and recommendations will impact development
  - UIC PN requirements extend permit review period beyond state permitting process
  - State permitting processes provide opportunity for meaningful public input
  - Since the PN requirements cannot be avoided, a rule-making is a more appropriate option
  - Delays compounded by restrictions on Area Permits
- Some support for the PN requirement and recommendations
  - Request direct notification of affected community of all potential environmental/infrastructure impacts
  - Expand notice beyond the ¼ mile distance from the facility
Monitoring and Reporting

• Congressional and vast majority of individual commenters did not address M&R

• Env NGOs/Water Associations supportive of guidance recommendations
  – Support seismic monitoring during and after hydraulic fracturing
  – Baseline testing for USDWs and drinking water wells
  – One NGO supports 20 year post operation monitoring

• O&G Industry believe the recommendations are burdensome and unjustified
  – No sufficient rationale for new requirements
  – Recommended requirements impede O&G production and are not in line with SDWA mandate

• State Regulators
  – Long term post fracturing monitoring would be regulation of a production well
Reducing Diesel Usage: Alternatives

- There exist two main types of diesel fuel alternatives:
  - Hydrocarbon-based fluids.
  - Synthetic fluids.

- Diesel alternatives are optimized to have properties similar to diesel to function as:
  - Fluid-loss additives.
  - Carrier fluid (for gelling additives).
  - Winterizing agents for extreme cold/winter treatments.

- Both alternatives are said to be more environmentally and toxicologically benign than conventional diesel fuels.

- Several oil/gas producers and oilfield services companies currently employ or produce diesel-free substitutes in their chemicals.
Diesel Fuel Alternatives

- Synthetic/advanced fluids:
  - Initially developed to combine the advantages of oil-based fluids along with low toxicity for offshore drilling purposes.
  - While a comprehensive data is lacking, these tend to be more benign than normal oil distillates, lower BTEX and aromatic hydrocarbon content.
  - Developments in industry over last decade in “greener” or more benign non-distillate alternatives are creating an increasingly more viable niche in oilfield services.
  - Existence of this niche market and ongoing innovation indicates that substitution between diesel and mineral oil/synthetic alternatives is indeed feasible in a pragmatic sense.
Diesel Fuel Alternatives

- Hydrocarbon-based fluids:
  - Conventional and enhanced mineral oils.
  - Contain less BTEX than diesel, and less total aromatic hydrocarbons.
  - Enhanced mineral oils are paraffinic mineral oils that have been hydrotreated or purified to remove aromatic hydrocarbons.
  - Mineral oils are amongst the most common diesel fuel alternatives in use currently.
  - Recommended by report of Secretary of Energy’s Advisory Board; Texas Railroad Commission (anecdotal)
Thank You!

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