



# Update on EPA Draft Guidance for Permitting Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels



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# Draft HF Permitting Guidance

- 5/10/12: Draft permitting guidance published in the Federal Register.
- 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# Draft Guidance Content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
9. Financial Responsibility
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

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)
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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  $\frac{1}{4}$  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
  - $\frac{1}{4}$  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 hydro-treated 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????????????