EPA Environmental Organization Webinar on Hydraulic Fracturing Using Diesel Fuels
Monday, May 16, 2011

Meeting Summary

Webinar Purpose

The purpose of the webinar was to engage in outreach with representatives from environmental organizations on approaches that the Underground Injection Control program may use to develop guidance for permitting the use of diesel fuels in hydraulic fracturing for oil and natural gas extraction. Hydraulic fracturing using diesel fuels is considered a Class II injection activity.

EPA presented background on the Underground Injection Control program and an overview of the guidance approaches. The presentations were followed by a question and answer session in which stakeholders were invited to comment and proposed additional approaches to permitting hydraulic fracturing using diesel. Questions posed by EPA to stakeholders included the following:

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

Introductory Presentations

Sean Porse (Geologist, Drinking Water Protection Division, Prevention Branch, EPA) presented basic information on EPA's Underground Injection Control program, outlining the history and purpose of the program. Under the Safe Drinking Water Act, the Underground Injection Control program is mandated to prevent the contamination of underground sources of drinking water

through migration from injection wells. The presenter described the six well classes, including the new Class VI for geologic sequestration of carbon dioxide. The technical requirements of the Underground Injection Control program fall into several broad categories, including site characterization, area of review, well construction, operation and monitoring, mechanical integrity testing , and well plugging and closure. All injection must be authorized by a permitting agency. Forty states and two tribes have primary enforcement responsibility (primacy) for all or some Underground Injection Control well classes, while other programs are under direct implementation by EPA.

Ann Codrington (Acting Director, Drinking Water Protection Division, EPA) outlined EPA's mandate to create a permitting guidance for hydraulic fracturing using diesel fuels. While most hydraulic fracturing activities are excluded from the Safe Drinking Water Act under the Energy Policy Act of 2005, hydraulic fracturing using diesel fuels is not and is subject to Safe Drinking Water Act requirements. The guidance aims to clarify existing Underground Injection Control Class II regulations, providing recommendations for permit writers so that permitting of hydraulic fracturing activities using diesel fuels provides the required protection of underground sources of drinking water.

Discussion Following the Introductory Presentations

A participant noted that the memorandum of agreement to eliminate diesels fuel in hydraulic fracturing fluids between EPA and members of the oil and gas industry has not been universally followed. EPA clarified that the memorandum of agreement specifically addresses the use of diesel fuel in hydraulic fracturing in coal-bed methane formations. As the use of hydraulic fracturing in other formation types, especially shale gas formations, increases, EPA has heard from states, EPA regional offices, and the industry that there is confusion regarding the permitting process for the use of diesel fuels in these hydraulic fracturing activities. Under the Safe Drinking Water Act, EPA is mandated to provide guidance about the permitting process to permit writers and owners and operators.

Webinar Discussion Summary

> *The statements made during this discussion do not represent the views or opinions of EPA. The claims made by participants have not been verified or endorsed by EPA.*

<u>What should be considered as "diesel fuels"?</u>

- Participants suggested several possible approaches for defining diesel fuels for the purposes of the guidance:
    1. Define diesel fuels according to Chemical Abstracts Service numbers.
    2. Define diesel fuels by a *de minimis* level. This could be a percentage (i.e., 1% or 10%) of the total fracture fluid volume or a set amount.
    3. Use a broad definition to include all hydrocarbon-based components of the fracture fluid, consistent with the third potential approach on the discussion question slide. Participants suggesting this definition noted that the toxic components of diesel, such as toluene and benzene, can have detrimental effects

on human health when present in extremely small quantities in drinking water. Participants suggested that this definition is the most appropriate for EPA's mandate to protect drinking water.

- EPA clarified that an owner or operator can submit locally available data on drinking water sources to demonstrate the location of underground sources of drinking water to the Director, as well as any nearby stratigraphic determinations. The Director can request additional information or sampling at his or her discretion.
- EPA clarified that the burden is on the owner or operator to demonstrate that wells in the AoR have been properly plugged and abandoned and that they will not become migration pathways for contamination into underground sources of drinking water.
- In response to a participant question on the use of state water well records, EPA clarified that these records may be used in some cases to locate private water wells within the area of review.

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

- A participant suggested that specific information, including volume of injectate and the chemistry of the base fluids and chemical additives, be made available during the public notice period.
- A participant suggested that mailing notifications to nearby landowners is important. The participant pointed out that this is especially important for horizontal wells—landowners along the entire length of the lateral should receive notification.
- Some participants suggested that the public notice period be 30 days or longer. A participant suggested that the public notice period be 60 days or longer.
- A participant disagreed with a statement made during the EPA webinar for industry representatives that a public comment period would slow down industry operations. The participant noted that owners and operators currently build time into their schedule to contract with hydraulic fracturing service providers, and that the public notice period could be included in this time period.
- A participant suggested that public notification be overseen by a regulatory agency.

<u>What are important siting considerations?</u>

- One participant supported determining the integrity of the confining layers, the first suggested approach on EPA's discussion question slide.
- Another participant emphasized identifying abandoned oil and natural gas wells within the area of review that could be potential conduits for fluid migration.
- A participant suggested independent evaluation of local geology and hydrology.
- A participant recommended prohibition of injection into underground sources of drinking water where companies are extracting coal-bed methane.

<u>What suggestions do you have for reviewing the area around the well to ensure there are no conduits for fluid migration?</u>

- A participant suggested that EPA review the Class I requirements for siting, construction, operation, monitoring, and prevention of fluid migration. The participant emphasized that the construction requirements under Class I ensure that fluids do not escape from the well. EPA responded that the hydraulic fracturing guidance will be based primarily on Class II regulations, because hydraulic fracturing using diesel fuels is considered a Class II injection activity.
- A participant suggested that a performance-based standard be used to delineate the area of review rather than allowing a fixed quarter-mile radius. The participant suggested that the performance-based standard be based on modeling of the physical and chemical extent of the fracture fluids and displaced formation fluids. Another participant noted that modeling should be supported by site-specific data.
- A participant suggested that if a fixed radius is used, one-half mile may be more appropriate than one-quarter mile.
- EPA clarified that the current Class II area of review requirements were designed for vertical drilling and other approaches may be appropriate for horizontal wells.
- A participant noted that in Region 8, EPA uses the quarter-mile fixed radius in the existing Class II regulations, but applies this to the lateral of the well in addition to the wellbore.

<u>What well construction requirements should apply to hydraulic fracturing using diesel fuels?</u>

- A participant suggested that EPA provide guidance on how to identify and isolate private water supply wells within the area of review.
- A participant suggested that EPA require information on the chemical and physical characteristics of the injection fluid during the construction phase to determine the compatibility of the fluid with the well materials.
- A participant noted that the American Petroleum Institute suggests that the surface casing extend 100 feet below the lowermost underground source of drinking water.

<u>What well operation and mechanical integrity requirements should apply to hydraulic fracturing wells using diesel fuels?</u>

- Some participants agreed with the fourth suggested approach on EPA's discussion question slide, regarding pressure testing prior to hydraulic fracturing activities to demonstrate well integrity. These participants also suggested that continuous pressure monitoring should be conducted. A participant noted that it is important to conduct pressure tests at a pressure likely to be used during hydraulic fracturing.
- A participant suggested that if there is any indication of a mechanical integrity problem during hydraulic fracturing, there should be automatic shutdown of hydraulic fracturing activities.
- A participant suggested an additional testing requirement for wells that experience loss of circulation during drilling.
- EPA noted that some state and industry representatives believe that EPA's authority under the Underground Injection Control program does not extend to requiring testing after hydraulic fracturing is complete and once the well is in the production phase. A participant noted that in some areas, operators are recovering 20% of injected fluid,

leaving the remainder of the fracture fluid downhole. The participant suggested that it is within EPA's authority to monitor the well and ensure that the remaining fluids do not migrate and threaten underground sources of drinking water.

<u>What monitoring and reporting requirements should apply to wells that are hydraulically fractured using diesel fuels?</u>

- Some participants suggested baseline monitoring of underground sources of drinking water, including geochemical testing of the injection and confining zones, and sampling of hydrocarbons. These participants also suggested radial bond logs.
- A participant suggested that the return flow volume be monitored.
- A participant suggested requiring the disclosure of chemicals used in the injectate.
- A participant suggested microseismic monitoring to measure fracture growth.
- A participant noted that it is important that monitoring results be reported to regulatory agencies in a timely fashion.

<u>What should the permit duration be, considering the intermittent nature of hydraulic fracturing and Class II plugging and abandonment provisions?</u>

- Some participants noted that the third suggested approach on EPA's discussion question slide (managing the well as temporarily abandoned when no injection is occurring) is consistent with current industry practices. These participants noted that the industry could view the first potential approach (a permit duration for the operating life of the facility) as inappropriate. These participants also objected to the second potential approach (a permit duration for the duration of fracturing activities) because it does not allow for Underground Injection Control enforcement later in the life of the well if an issue arises related to past hydraulic fracturing activities.
- A participant noted that a majority of the injectate remains in the subsurface after fracturing and suggested that if this fluid returned to the surface, even during the production phase of the well, it may be under EPA's authority under the Underground Injection Control program.

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

- A participant suggested that an individual permit for each well is the most appropriate permitting approach. The participant noted that conditions vary from site to site, including proximity to plugged and abandoned wells.

<u>What information should be submitted with the permit application?</u>

- A participant suggested that EPA consider overlap between different operators in the same field so that the permitting agency can understand the cumulative effects of all operators and drilling programs in that area.
- A participant expressed approval of EPA's list of potential approaches.

- A participant suggested that EPA require information on past problems encountered at a well during drilling and stimulation.
- A participant suggested that EPA consider surface storage of diesel (i.e., in the flowback). EPA clarified that this may fall under the authority of state oil and gas programs or other regulations.

<u>What should the time frame be for submitting a Class II permit for hydraulic fracturing using diesel fuels?</u>

- A participant suggested that the time frame should be a minimum of 30 days. Another participant suggested a minimum of 60 days.

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

- A participant suggested a bond program that would protect surface owners whose wells may be impacted by hydraulic fracturing activities. EPA clarified that the current regulations allow for financial responsibility to pay for plugging and abandonment of wells, but not remediation.
- A participant suggested that the financial responsibility calculation include the cost of a contractor. EPA clarified that the Class II regulations are performance-based and do not include this calculation.

Webinar Attendance

The webinar was attended by individuals representing EPA Headquarters and regional offices, consulting firms, and environmental groups. Organizations represented include the following:

ALL Consulting
Earthjustice
Earthworks
Environment America
Environmental Working Group
EPA Headquarters
EPA Region 7, Kansas City, KS
EPA Region 8, Denver, CO
EPA Region 9, San Francisco, CA
National Resources Defense Council
Powder River Basin Council
Veil Environmental, LLC
WaterJamin Legal and Policy Consulting Services