

August 21, 2013

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Acting Director
U.S. Department of the Interior, Director (630)
Bureau of Land Management
Mail Stop 2134 LM
1849 C St., NW
Washington, DC 20240
Attention: 1004-AE26

Re: Comments on Revised Proposed Rule on Hydraulic Fracturing on Federal and Indian Lands

Dear Acting Director Kornze:

Thank you for this opportunity to comment on the Bureau of Land Management's (BLM's) revised proposed rule to regulate certain aspects of hydraulic fracturing operations, published in the Federal Register on May 24, 2013 at 78 Fed. Reg. 31636. The Wilderness Society (TWS), a national non-profit organization with over 500,000 members and supporters, has a strong interest in protecting BLM acreage from the adverse impacts of oil and gas drilling and production. We believe that there are some places that are too special to drill or subject to hydraulic fracturing, though we recognize that this kind of activity as one of the multiple uses of public lands envisioned under the Federal Land Policy and Management Act.¹ Where hydraulic fracturing takes place, we want to ensure that it is conducted pursuant to robust standards that will protect the many values of our public lands.

Section I below discusses key changes to the 2013 proposed rule compared to BLM's 2012 proposal.² Section II discusses the federal and state roles regarding hydraulic fracturing, and sections III through VI address specific aspects of the 2013 proposal. Section VII provides details on areas where BLM should consider additional regulatory actions regarding hydraulic fracturing operations.

¹ FLPMA calls for management of public lands under the principles of sustained yield and multiple use. 43 U.S.C. §1732.

² BLM, Oil and Gas; Well Stimulation, Including Hydraulic Fracturing, on Federal and Indian Lands, (77 Fed. Reg. 27691 (May 11, 2012)).

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I. The 2013 and 2012 Proposed Rules

We understand that BLM received over 177,000 comments on the 2012 proposed rule, including requests to strengthen the rule as well as to weaken it. We appreciate BLM’s revisions of the 2012 rule in several areas, including the provisions for: Cement Evaluation Logs (CELs), assessing likely fracture propagation, isolation of all usable water to prevent contamination, and mechanical integrity tests for fracturing and refracturing operations. But we are concerned that in a number of areas the 2013 proposal has been weakened to the detriment of the public interest:

- Under section 3162.3-3(j), operators would no longer have to submit information claimed to be a trade secret unless specifically requested by BLM. Even if information claimed to be a trade secret is not made directly available to the public, it should be automatically provided upfront to BLM (as was required under the 2012 proposal).
- Under section 3162.3-3(j)(1), notice of fracturing information would be provided through FracFocus. As discussed below in Section III.D, we believe this provides inadequate disclosure.

- Under section 3162.3-3(i), operators would no longer be required to provide the estimated chemical composition of flowback fluids. We believe that the chemical constituents should be reported at each stage, or the operator should ensure that the maximum chemical constituents for the overall operations are reported. BLM has also deleted the requirement that the operator report the actual access route and transportation method for all water used in fracturing wells.
- Operators would be required to submit CELs on “type wells” rather than requiring evaluation of cement jobs on all wells where casing serves as a barrier between fracturing operations and usable water (see sections 3162.3-3(d) and 3162.3-3 (e)). We are concerned that type wells may not be representative of all the wells for which CELs are submitted.
- The scope of the rule would apply only to hydraulic fracturing operations, and not to other “well stimulation” activities such as acidizing.

Additionally, we are disappointed that BLM did not opt to strengthen the rule by requiring pre- and post-fracturing water monitoring, pre-fracturing notice of chemical constituents, measures to reduce flaring, the use of enclosed tanks for storing fracturing fluids, and proper well abandonment and remediation. Moreover, BLM needs to prohibit the use of diesel-based and other toxic chemical-based fracturing fluids as water-based alternatives are available. We urge BLM to include these requirements in future rulemakings as soon as possible.

These comments focus on pre-fracturing notice and other issues related to disclosure; storage and handling of fracturing fluids and recovered water; cement evaluation logs; pressure testing; and water protection, since these issues have been considered in BLM’s 2012 and 2013 proposals. Other important issues that need to be addressed are included in the table at the end of these comments.

II. Federal Regulations Should Set Baseline Requirements for Hydraulic Fracturing on Federal Lands

Currently, BLM lands are subject to a patchwork of state hydraulic fracturing regulations. Some provide for best practices while others do not. States are not legally required to meet the stewardship standards that BLM must observe under the Federal Lands Policy Management Act (FLPMA),³ and states do not share in the federal government’s trust responsibilities for Indian lands.⁴

It is essential that the federal government ensure adequate regulations are in place for industrial activities occurring on the lands it manages while providing states with the ability to exceed those requirements or to address atypical conditions. The Clean Air and Clean Water Acts both are structured to provide minimum federal standards. This approach brings needed consistency for

³ FLPMA directs the BLM to manage the public lands so as to prevent unnecessary or undue degradation, and protect the ecological, environmental, and water resources for future generations. 43 U.S.C. §§ 1702(c), 1740.

⁴ *E.g.*, Indian Mineral Leasing Act, 25 U.S.C. § 2103(b); Indian Energy Act, 25 U.S.C. § 3504(e)(6).

companies operating in multiple states. For state governments, this approach saves resources, as each state can rely on the federal government with its greater capacity to provide an adequate regulatory baseline.

Based on experience to date regarding hydraulic fracturing, if the states alone regulate these operations, there will be gaps in those standards (i.e., no state has “model” regulations), and inadequate stringency or delays in implementation in states with powerful hydraulic fracturing interests.

We support BLM’s proposal allowing federal compliance to be achieved where state or tribal disclosure requirements meet or exceed the federal standard (section 3162.3-3(k)). The federal regulations should set a floor, not a ceiling, for compliance.

BLM requested comments on whether compliance with its proposed section 3162.3-3(i)(1) should be satisfied by compliance with state or tribal requirements for the same or more information about the chemical constituents of hydraulic fracturing fluids. We support the proposal for statewide or tribal land exemptions, provided that a state or tribe has an adequate system for conveying information about hydraulic fracturing activities to the public (though such an approach is unwieldy and a single database is preferable). As discussed below, we believe that FracFocus does not provide sufficient disclosure and we recommend that BLM use its own website to provide disclosure, especially since some members of the public will be interested in information from multiple states if they live near a border. States or tribes with disclosure regulations that BLM deems meet or exceed federal requirements could use their own websites to provide this information and BLM could provide a link on its website to the states’ or tribes’ websites. Under no circumstances should section 3162.3-3(k) be used to exempt operators from making the disclosures required by the proposed rule.

While we appreciate the need to provide flexibility in the regulatory process, we are concerned about how BLM would carry out exemptions and variances. We suggest that BLM add some more specific criteria for variances, including that the proposed activity:

1. complies with all other applicable laws;
2. will not negatively interfere with the use of adjacent property;
3. will not promote waste;
4. is based on sound engineering and geoscience principles;
5. will not result in an increased risk to health, safety, or the environment, including freshwater, and
6. achieves the intent of the section(s) containing the standards applicable to the activity or development to an equal or better degree.

For a statewide variance, BLM also needs to ensure that enforcement and public participation requirements were equivalent or stronger than federal actions.

While a variance may be justified in certain limited circumstances, under no circumstance should regulatory requirements for hydraulic fracturing be waived for an individual operator. The very purpose of this rulemaking is to determine what is necessary to avoid waste, to comply with sound engineering and geoscience principles, to protect disclosure rights, and to reduce any risk to health, safety, or the environment, including freshwater. A potential case-by-case waiver subverts the current public rulemaking process and the substantial efforts for effective regulatory oversight by BLM, invites unfair and otherwise arbitrary decision-making—as well as litigation over such decision-making—and could be an enormous drain on staff resources. For these reasons, no waiver of the regulatory requirements should be allowed.

It is also important that BLM has a system for monitoring state and tribal regulations to make sure that regulatory changes do not allow hydraulic fracturing operations on federal and Indian lands to not meet minimum federal requirements. If a state or tribe changes its regulations, BLM rules should automatically be reapplied (i.e., a statewide exemption should be nullified), unless a state or tribe demonstrates that the revised regulations meet or exceed federal standards.

III. Importance of Disclosure

We are pleased to see that BLM’s proposed regulations include provisions for the public disclosure of the contents of fracturing fluids. Fifteen states have implemented hydraulic fracturing disclosure rules, though fracturing takes place in at least 29 states.⁵ Transparency will help increase public confidence to the extent it demonstrates that hydraulic fracturing is done safely and with non-toxic chemicals. In the event of an accident or harm to human health or the environment, disclosure is critical to emergency response as well as the longer-term care of affected community members and resources.

A. Disclosure Should Be Before Fracturing Occurs

We are concerned, however, that proposed section 3162.3-3(d) does not provide for *pre*-fracturing public disclosure of fracturing fluid chemicals, only *post*-fracturing. Pre-fracturing public disclosure is important to allow land owners, public land managers, and users of nearby water sources to conduct independent baseline water quality testing to determine if water resources are uncontaminated or if they contain any of the chemicals planned to be injected during hydraulic fracturing. If specific chemical data are not provided until after hydraulic fracturing occurs, a concerned person would not know which chemicals may have been used and therefore which analytical tests should be performed. Without the ability to conduct effective baseline testing, it will be difficult if not impossible to establish causal responsibility when chemicals are discovered where they do not belong. Pre-fracturing, baseline water quality testing avoids the defense that “the contamination was there before we arrived.” If fracturing chemicals are safe and leaks are unlikely, then there should be little resistance to pre-fracturing disclosure.

⁵ See Matthew McFeeley, *NRDC Issue Brief 12-06-A, State Hydraulic Fracturing Disclosure Rules and Enforcement: A Comparison* 7 (July 2012). The states include Alabama, Arkansas, Colorado, Indiana, Louisiana, Michigan, Montana, New Mexico, North Dakota, Ohio, Pennsylvania, Texas, West Virginia, Wyoming, and most recently, Illinois. See 30 ILCS 105/5.826. Alaska, California, and New York are in the process of developing regulations.

Prior disclosure is particularly important in areas that will be fractured by multiple operators. For example, in North Dakota's Bakken formation, over 3,000 new wells have been drilled in the past five years with over 80 companies leasing, drilling and hydraulically fracturing in the area.⁶ Without prior disclosure, a landowner cannot know which operator will be fracturing a particular well, or if fracturing fluids used by different operators differ.

We suggest that chemical information required by proposed sections 3162.3-3(g)(4) and (5) be provided in the applications for permits to drill (APDs) or another notice, and made available to nearby landowners, non-owner residents, managers of public water supplies, and the general public.⁷ Upon approval, a final copy of this information should be provided to nearby landowners and the public with sufficient lead time to conduct independent baseline testing, if individuals or local governments, for example, elect to exercise that option. If an operator changes the fracturing products identified in a permit, the operator should be required to provide notice of the change prior to commencing fracturing operations.

B. Claimed Trade Secrets Should Not Preclude Right to Know

We are disappointed that proposed section 3162.3-3(j) has been revised to relieve operators of the requirement to submit information claimed to be a trade secret. It is broadly acknowledged that the public and those working with fracturing chemicals have a right to know what these chemicals are.⁸ It is not enough for BLM to retain the authority to require operators to submit this information at some point in the future—complete, upfront disclosure of all chemicals and techniques used in well fracturing is necessary to adequately assess proposed activities and protect the environment and public health.

We disagree with BLM's determination that it lacks statutory authority to exclude hydraulic fracturing chemicals by regulation from the scope of the Trade Secrets Act.⁹ To the extent BLM

⁶ Natural Resources Defense Council and Sierra Club's Response to Questions for the Record from Chairman Wyden Regarding Disclosure Senate Committee on Energy and Natural Resources, May 23, 2013 Hearing, p. 4, submitted June 5, 2013, available at http://www.eenews.net/assets/2013/06/07/document_ew_01.pdf.

⁷ An example of a state regulation that requires pre-fracturing disclosure of chemicals is Wyoming Oil and Gas Conservation Commission Rules, Chapter 3 § 45. *See also* Illinois Hydraulic Fracturing Regulatory Act, Public Act 098-0022, 30 ILCS 105/5.826, §140 (requiring that notice of high volume fracturing be sent to all landowners within 1,500 feet of the proposed well site and to each municipality and county in which the well site is proposed to be located, as well as newspaper publication); Idaho Administrative Rules 20.07.02, §55.01(m) (requiring notice of well treatments to be sent to all home owners and water well owners as well as public drinking water systems within one-quarter mile of a well; the notification must offer an opportunity to have the owner or operator sample and test the water, at the owner or operator's cost, prior to and after the oil or gas well being treated).

⁸ *See* Det Norske Veritas AS, DNV-RP-U301, Risk Management of Shale Gas Developments and Operations (Jan. 2013), p. 29 [hereafter "DNV Recommended Practice"] (setting forth recommended regulations, none of which suggest trade secret exemptions, and stating, "Data should be openly disclosed to relevant stakeholders. Updates should be issued regularly[.]").

⁹ *See* 78 Fed. Reg. 31636, 31660. As noted by the D.C. Court of Appeals, the Trade Secrets Act, by prohibiting only unauthorized disclosures, could allow at least some agencies to opt out of its strictures. "[N]othing in the Act directs or guides an agency in deciding whether it ought to exercise its power to authorize revelation of officially collected commercial and financial data." *CNA Financial Corp. v. Donovan*, 830 F.2d 1132, 1139 (C.A.D.C. 1987).

believes it lacks regulatory authority to reveal claimed trade secrets to the public, we encourage BLM to coordinate with other federal agencies with clear authority to require operators to make chemical information available (e.g., under the Emergency Planning and Community Right-to-Know Act, or EPCRA).

In the event that BLM retains the proposed trade secret exemptions (which it should not), all trade secret exemptions should be justified. BLM should not rely on a simple affidavit stating that information is a trade secret. Trade secret claims should be supported with specific factual justifications demonstrating entitlement to the exemption, similar to what is required under the EPCRA regulations,¹⁰ which provide similar disclosures of industrial chemicals. Where an operator shows that chemical information meets the criteria for a trade secret, BLM should weigh the operator's interest in preserving this secret with the public's interest in obtaining information about the chemicals used on public lands.¹¹ There should be a clear process for evaluating claims whereby the public can challenge decisions to preclude access to information.¹² These requirements would discourage questionable trade secret claims, helping to ensure that trade secret protections are not exploited to avoid disclosure.¹³

Even if information is withheld from the public, all information regarding fracturing chemicals should be provided to BLM along with the operator's application for a permit to drill or other notice (similar to what BLM proposed in 2012 and consistent with Clean Air Act and Clean Water Act provisions¹⁴), and the information should be immediately available to emergency responders and medical professionals upon reasonable requests.¹⁵ Unlike the Colorado rule on which the BLM's proposed trade secret provisions are based, section (j) does not specifically provide for chemical information to be given to health officials or medical professionals in the event of an

¹⁰ See 40 C.F.R § 350.7 (Substantiating claims of trade secrecy); Arkansas Rule B-19 (l)(8) (adopting trade secret criteria in EPCRA, 42 U.S.C. § 11042). Wyoming regulations also require applicants to justify and document the nature and extent of the proprietary information in connection with fracturing chemicals. See Wyo. Adm. Regs., Ch. 3, §45(d) (reporting requirements) and §45(f) (referring to confidentiality protection afforded under the Wyoming Public Records Act, Wyo. Stat. § 16-4-203(d)(v)) and

¹¹ See, e.g., Alaska Code, 18 AAC 31.015 (Confidentiality of trade secrets). Under this regulation, the Alaska Department of Environmental Conservation (ADEC) considers whether the public interest that would be served by disclosure is outweighed by the privacy interest in preserving the secret. ADEC has the authority to release information in an emergency.

¹² See, e.g., 40 C.F.R § 350.15 (Public petitions requesting disclosure of chemical identity claimed as trade secret).

¹³ In some cases trade secret claims are clearly unjustified, because the information has been disclosed elsewhere. A Harvard Law Study provides examples where operators disclosed chemicals for one well, but claimed that these same chemicals were protected as trade secrets for other wells. Kate Konschnik, Harvard Law School Environmental Law Program Policy Initiative, Legal Fractures in Chemical Disclosure Laws: Why the Voluntary Chemical Disclosure Registry FracFocus Fails as a Regulatory Compliance Tool, 9 (April 23, 2013), available at <http://blogs.law.harvard.edu/environmentallawprogram/files/2013/04/4-23-2013-LEGAL-FRACTURES.pdf>.

¹⁴ 42 U.S.C. § 7414(c) (Clean Air Act); 33 U.S.C. § 1318(b) and 40 C.F.R. § 122.7 (Clean Water Act).

¹⁵ See, e.g., 16 Texas Admin. Code § 3.29(c)(4) (allowing access to hydraulic fracturing trade secret information by health professionals and emergency responders). Even when information may be considered proprietary, disclosure to the public has been upheld when authorized by law. See, e.g., *U.S. v. Geophysical Corp. of Alaska*, 732 F.2d 693, 702 (9th Cir. (Alaska) 1984).

emergency.¹⁶ This information is critical to enable medical professionals and emergency responders to make accurate diagnoses and provide proper treatments.

Even in a non-emergency, at a minimum, the chemical family of each substance considered a trade secret should be disclosed to the public.¹⁷ This would provide basic information to the public about the chemicals.

Proposed section 3162.3-3(j)(4) would require operators to keep the information claimed to be trade secrets for 6 years. Because of the time required for certain forms of underground fluid migration, fracturing may cause groundwater contamination that is not discovered until years after disclosure occurs. Data regarding fluids used should be available at that time to assist in determining the source of contamination and necessary remediation or other measures. We suggest that, similar to Colorado's Rule 205(f), information be kept on file and available for inspection for the life of the applicable oil and gas well or oil and gas location and for five (5) years after plugging and abandonment.

C. Require Disclosure of Chemical Constituents and Base Fluid

Similar to the regulations proposed in 2012, proposed section 3162.3(i)(1) would require operators to identify to BLM fracturing fluids by additive trade name and additive purpose, the Chemical Abstracts Service Registry Number, and the percent mass of each ingredient used in fracturing operations. It is not clear whether BLM is requiring the percent mass of each *chemical* within the fracturing fluid or each *ingredient*.¹⁸ We urge BLM to require the former. If an operator is only required to indicate that the fluid contains 1% of Ingredient X, and Ingredient X contains benzene, then BLM (and the public) will have no way of knowing how much benzene is in the fracturing fluid. We suggest that BLM clearly require reporting of the concentration of each *chemical constituent* within the fluid.

In some states, industry representatives have expressed unwarranted concerns that disclosing the concentrations of chemical constituents, if linked to additive products, might allow competitors to reverse-engineer proprietary additive products. This risk is easily avoided by: (a) requiring the operator to report the concentrations of all chemicals (identified by CAS Registry number) used in

¹⁶ See 78 Fed. Reg. 31636 (stating that BLM's proposed trade secret provisions are modeled on the procedures promulgated by the State of Colorado). Colorado Rule 205(d) specifically allows the director of the agency governing fracturing to "disclose information regarding those chemical constituents to any Commissioner, the relevant County Public Health Director or Emergency Manager, or to the Colorado Department of Public Health and Environment's Director of Environmental Programs upon request by that individual." The rule goes on to control the confidentiality of this information. Rule 205(e) requires a company to provide information on chemical constituents to "any health professional who requests such information in writing if the health professional provides a written statement of need for the information and executes a Confidentiality Agreement, Form 35."

¹⁷ See, e.g., Colorado Oil and Gas Conservation Commission Rule 205A.b.2.B (requiring disclosure of the chemical family when the chemical identity of a hydraulic fracturing additive is withheld).

¹⁸ The language in the draft section 3162.3-3(i)(1) requires the "maximum ingredient concentration" percentage by mass in each additive and in the overall volume of fracturing fluid; while 78 Fed. Reg. 31636, 31658 states that section 3162.3-3(i)(1) would require the "maximum concentration of each chemical" used in both the additive and in the hydraulic fracturing fluid.

hydraulic fracturing, but (b) not requiring that the chemicals be organized according to the additive of which they are a part. Such an approach would ease any proprietary concerns but nonetheless facilitate the necessary disclosure of both the individual chemical constituents used and their quantities.

D. FracFocus is Not a Sufficient or a Suitable Substitute for Agency Action

The revised proposed section 3162.3-3(i) would provide for information to be reported to the Interstate Oil and Gas Compact Commission/Groundwater Protection Council hydraulic fracturing web site (<http://www.fracfocus.org>), a website used by a number of states to provide disclosure. While FracFocus provides a website with a mapping function, it has some serious shortcomings (as described below).¹⁹ We do not recommend the use of FracFocus unless BLM is able to work with the Interstate Oil and Gas Compact Commission/Groundwater Protection Council to resolve these problems.

First, the standardized disclosure form on FracFocus does not allow for disclosure of all the information that BLM proposes to require. For instance, proposed sections 3162.3-3(i) and (d)(3) would require companies to indicate the source of water used in operations and whether it is reused or recycled. But the current version of FracFocus provides no field for entry of base fluid type and explicitly states that the figure reported in the “Total Water Volume” field “may include fresh water, produced water, and/or recycled water.” If FracFocus is to be used for mandatory disclosure, FracFocus must display all required information.

Second, it currently is not possible for the public to search and aggregate data in FracFocus. Access to the database of information mandated for public disclosure and aggregation of search result data is important because it provides information such as how many wells are hydraulically fractured in a given area, or the total quantity of a given chemical used in that area, so that the environmental and health impacts of fracturing can be better understood. Providing access to aggregate data allows researchers, the public, and decision makers to look beyond conditions at individual wells and make broader policy assessments about the relative risks presented by fracturing in a particular area, or with a particular chemical.

Third, in addition to these technical limitations, FracFocus’s terms of use purport to limit republication of the data provided on the site, such that users cannot link to FracFocus disclosure documents directly without first obtaining permission from the site²⁰ (the site has made it impossible to do so) and are prohibited from reposting disclosures by the site’s terms of use. This makes it impossible to share a single disclosure without violating the site’s terms of use unless permission first is obtained from FracFocus to do so. This restriction limits the public’s ability to share, discuss, study, and use information about what chemicals are being used and the risks posed.

¹⁹ During a July 17, 2013 Interior Department oversight hearing held by the House Natural Resources Committee, Representatives Cartwright and Lowenthal identified some of these shortcomings. Interior Secretary Sally Jewell agreed that FracFocus has some problems. She also stated, “If we find that it is not in fact a tool to display that information in an accurate, transparent way, then we will look at other opportunities to do that.”

²⁰ <http://fracfocus.org/terms-of-use>, § 7.

Limitations on the public's ability to aggregate and otherwise use FracFocus data may conflict with President Obama's recent Executive Order on Government Information, which states that "Government information shall be managed as an asset throughout its life cycle to promote interoperability and openness, and, wherever possible and legally permissible, to ensure that data are released to the public in ways that make the data easy to find, accessible, and usable."²¹

Fourth, compliance with reporting requirements may be reduced unless BLM staff members review information submitted to the website as rigorously as they review submissions directly to the agency. A recent study by researchers at Harvard University Law School found that, out of all chemicals disclosed on FracFocus from Texas wells over a month-long period, 29 percent of Chemical Abstract Service numbers reported did not exist.²²

Finally, FracFocus does not allow for disclosure prior to fracturing operations (see our discussion on the importance of this disclosure, above).

We recommend that BLM upload the reports submitted by operators to BLM's website and create a database searchable by geographic area, chemical, Chemical Abstract Service number, time period, and operator. For each well, the database should contain links to the permit application, permit, and other files so that all of the information related to a well may be accessed by the public. This database should be downloadable and allow and facilitate aggregation, reorganization, analysis, and redistribution of data. Alternatively, BLM should work with the Interstate Oil and Gas Compact Commission/Groundwater Protection Council to resolve the problems discussed above. In our view, a BLM database would not be difficult to construct and would be far preferable than adjusting FracFocus to address BLM's and the public's needs.

III. Storage and Handling of Fracturing Fluids and Recovered Water

A. Require Complete Information on Recovered Fluids

We support the proposed requirements in section 3162.3-3(d)(5) to provide BLM with information on the handling of recovered fluids, as well as the corresponding requirements following completed operations in section 3162.3-3(i)(5) (recovered fluids). This information is needed to ensure that proper storage and disposal occurs and to minimize risks to human health and the environment. As discussed above, we believe that operators should be required to reveal the chemical composition of fracturing fluids.

The 2013 proposal indicates that "BLM has deleted the requirement for operators to provide the estimated chemical composition of flowback fluids because it would in effect require operators to reveal the total chemical constituents of their hydraulic fracturing fluids prior to operations." As

²¹ Exec. Order No. 13,642, Making Open and Machine Readable the New Default for Government Information (May 9, 2013).

²² Kate Konschnik, Harvard Law School Environmental Law Program Policy Initiative, Legal Fractures in Chemical Disclosure Laws: Why the Voluntary Chemical Disclosure Registry FracFocus Fails as a Regulatory Compliance Tool 7 (April 23, 2013).

noted above, a requirement to reveal the total chemical constituents in the fracturing fluid would facilitate medical diagnoses and would not require the operator to reveal the percentage of chemical constituents in each additive. While we are not suggesting that operators be required to conduct tests to determine the chemical composition of flowback fluid, we believe that BLM should retain the proposed 2012 requirement to report the estimated chemical composition.²³ If operators change the chemical composition of fluids used in fracturing operations, then both BLM and the public are entitled to know the new chemical composition.

Proposed section 3162.3-3(i)(2) deletes the requirement that operators report the actual access route and transportation methods for all water used in fracturing wells since this information is provided before operations are approved. We suggest that operators be required to report any changes in approved access routes and transportation methods.

B. Recovered Fluids Should be Stored in Enclosed Tanks; Pits Should Not be Permitted

We oppose the proposal in section 3162.3-3(h) allowing operators to store recovered fluids in lined pits rather than requiring storage in enclosed tanks.²⁴ The use of temporary surface impoundments or pits results in large-scale surface disturbances, increased air emissions, and provides an opportunity for wildlife to become contaminated and injured. Pits also have the potential for leakage to occur through or around their liners, or for overflow to occur during periods of heavy precipitation, impacting surface waters and the subsurface.

Liners, by their very nature, eventually will leak. To make matters worse, BLM has not proposed any requirements to ensure compatibility of recovered fluids with liner materials. While it is true that enclosed tanks can corrode and leak or spill as well, that is less likely and frequent than for lined pits and can be effectively prevented with appropriate rules and management practices. Additionally, enclosed tanks minimize the risks to wildlife and from adverse air emissions. Since BLM has stated its desire that this hydraulic fracturing rule provide “baseline environmental safeguards,”²⁵ it would run counter to that goal to allow lined pits to be used rather than enclosed tanks, which already are in use by many operators.

²³ See Wyo. Adm. Regs., Ch. 3, §45(d) (requiring the operator to provide, *for each stage of the well stimulation program*, the chemical additives, compounds and concentrations or rates proposed to be mixed and injected).

²⁴ See DNV Recommended Practice, p. 23 (suggesting the following regulatory requirement: “avoid the use of any pit, impoundment or pond for storage or disposal of fracturing fluids, flowback water, produced water or other liquids or wastes used in, or produced by, shale gas activities ... collect cuttings and flowback fluids in closed tank systems fitted with overflow protections.”); *id.* at 25 (“Use of tanks in closed-loop tank systems is encouraged because this facilitates off-site disposal of wastes while more efficiently utilizing drilling fluid and provides additional insurance against environmental releases.”).

²⁵ BLM news release announcing these proposed rules, May 16, 2013, http://www.blm.gov/wo/st/en/info/newsroom/2013/may/nr_05_16_2013.html.

Absent a change in regulations, BLM would allow storage in pits for up to 90 days, with the possibility of an extension.²⁶ Pits could be in place up to six months after well plugging, with the possibility of a variance.²⁷ Pits could be lined or unlined, depending on the fluids' total dissolved solids concentration and the quality of nearby waters.²⁸

The best practice for hydraulic fracturing chemical use and waste storage is to bring the hydraulic fracturing chemicals to the well site in tanks; to combine the chemicals with water on site in enclosed tank systems; to inject the mixtures into wells during fracturing; and to capture fracturing fluid wastewaters at the surface in enclosed tank systems for transportation to other wells for reuse, to waste injection wells, or to certified waste treatment and disposal facilities (in that order of priority as discussed in the next section).²⁹ The use of surface impoundments and lined pits should be eliminated altogether, both for recovered fluids and produced water (defined in the proposed rule as fluids recovered from a hydraulically fractured well after it begins production of oil or gas).

C. *Waste Fluid Disposal Should be Subject to a Hierarchy of Reuse/Recycling, Injection, Treatment/Disposal*

All hydraulic fracturing chemical waste and flowback waters that are not reused/recycled should be collected and injected into Environmental Protection Agency-approved subsurface disposal wells. If disposal well injection is not technically feasible or unsafe to freshwater resources in an area, the hydraulic fracturing fluid waste should be collected and transported via enclosed tank systems or via pipeline to a waste handling and treatment facility that is certified, trained, equipped, and qualified to treat and dispose of this waste. We recommend that operators be required to demonstrate to BLM inspectors, upon request, that they followed this hierarchy of waste management options.

IV. Well Integrity

A. *Ensure Cementing Integrity for All Wells*

We appreciate the proposed new section 3162.3-3(e), requiring a Cement Evaluation Log (CEL) prior to hydraulic fracturing operations for each casing (including intermediate casings) to protect usable water. We support the substitution of CELs for Cement Bond Logs, provided that the type of CEL used can detect channeling in any location. Using advanced cement evaluation tools is crucial, as traditional bond logs cannot detect the fine scale channeling which may allow fluids to slowly migrate over years or decades. BLM should specify that *radial* CELs are required. The term “micro-seismogram” should be eliminated from the rule, as it typically refers to a technology used to monitor and map hydraulic fracturing operations rather than to evaluate cement integrity.

²⁶ See BLM's Onshore Order No. 7, III (A), http://www.blm.gov/wy/st/en/programs/energy/Oil_and_Gas/docs/onshore_order_7.html; 78 Fed. Reg. 31655.

²⁷ See BLM's Onshore Order No. 1, 72 Fed. Reg. 10329 (Mar. 27, 2007); 78 Fed. Reg. 31655.

²⁸ See BLM's Onshore Order No. 7, III (D)(2); 78 Fed. Reg. 31655.

²⁹ See, e.g., 30 ILCS 105/5.826.

The proposed regulations in sections 3162.3-3(d) and 3162.3-3 (e) would require CELs only on “type wells,” wells that are not preceded by approved type wells or are not part of an approved field development proposal, and whenever there is evidence of a problem with cement jobs. The definition provided for “type well” in section 3160.0-5 is “an oil and gas well that can be used as a model for well completion in a field where geologic characteristics are substantially similar within the same field, and where operations such as drilling, cementing, and completions using hydraulic fracturing are likely to be successfully replicated using the same design.”

But the proposed rule does not require the operator to certify that it will use similar cement composition, fracturing fluids or drilling practices in subsequent wells. Nor does it require the operator to submit proof that subsequent wells have substantially similar geological characteristics. The use of type wells assumes that geologic zones are compositionally, texturally, and mechanically homogeneous media, even though this is often not true. Faults can remove or add sections of rock over short distances. Folding can result in reoriented or repeated sections of rock. Tilting can result in formations at differing depths with missing sections. Missing sections can also result from the presence of unconformities. Even if the geology is perfectly consistent, operator inconsistencies during drilling could result in unexpected differences in borehole geometry that could affect the cement as it is squeezed into the annulus.

BLM acknowledges some uncertainty about the benefits of the type well concept in the preamble to the proposed rule: “there is uncertainty about the effectiveness of the type well concept, and how reliably the CEL results on casing strings of a type well assure adequate cementing for subsequent wells in the same geologic area.”³⁰ We recommend that BLM require cement evaluation logs on *all* wells where casing serves as a barrier between fracturing operations and usable water (similar to what was proposed in 2012); or to ensure the similarity of wells, cementing, fracturing fluids and processes, and homogeneous, non-complex geologic characteristics prior to utilizing “type well” approval procedures.³¹

We appreciate the proposed requirements in section 3162.3-3(e)(1) to monitor and record the flow rate, density, and treating pressure during cementing operations. But the cement operation monitoring report should be submitted to BLM within 30 days after completion of *cementing* to ensure adequate time for a federal response, not 30 days after completion of all *fracturing operations*. Similarly, the cement evaluation log or logs run on each casing protecting usable water should be submitted to BLM 30 days after their completion (see proposed section 3162.3-3(e)(2)). We support the proposed requirement in section 3162.3-3(e)(4) that an operator report any indication of inadequate cementing to the BLM within 24 hours and to submit a CEL to BLM prior to fracturing, particularly if BLM decides not to require prior submission of CELs for all wells.

³⁰ Proposed Rules, 75 Fed. Reg. 31664 (May 24, 2013).

³¹ See DNV Recommended Practice, p. 33 (“Cement logging represents a core quality control procedure in the construction of shale gas wells. Casing cement that forms part of the well barrier envelope in the fracturing or production operation shall be verified by cement bond logs. ... It is important to track local changes of the production casing/liner and the interface between the casing wall, cement and formation.”)

B. *Ensure Adequate Pressure Testing Before Operations*

We support the proposed requirement in section 3162.3-3(f) for an operator to perform a successful mechanical integrity test (MIT) prior to beginning hydraulic fracturing or refracturing operations. The proposal would require the MIT to simulate the pressure conditions that would be seen in the proposed fracturing treatment. We suggest that this be revised slightly so that: (1) the casing is subject to the maximum fracture treatment, plus a 10% safety factor; and (2) the operator must notify the authorized officer of a failed MIT *prior* to fracturing operations, similar to what is required under 3162.3-3(e)(4) for cementing operations.³²

Rather than rely on corrective action after a violation of the requirement to conduct a MIT, BLM should require the operator to notify the authorized officer as soon as practicable but no later than 24 hours following any failed test; the operator should also be required to perform remedial work to restore mechanical integrity. Operations should not be allowed to recommence until a successful mechanical integrity test is performed.

We further suggest that BLM clarify that MITs are required for each and every well—not just for a type well. The Federal Register description of the proposed rule at page 31652 states that it is “necessary to perform a MIT prior to each refracturing operation,”³³ but the rule itself at section 3162.3-3(f) does not specifically state that a MIT must be performed on each well. MITs are as important for older wells being refractured as for new wells. According to oil and gas technology supplier Schlumberger, by the time an oil or gas well is 15 years old there is a 50 percent probability that it will have measurable sustained casing pressure – an indicator of compromised zonal isolation in a well.³⁴

We support the proposed clarification in section 3162.3-3(g)(1) that the pressure in the annulus at the bradenhead between all intermediate casings and the production casing must be continuously monitored and recorded during fracturing and refracturing operations.³⁵

We support the new requirement in section 3162.3-3(g)(2) for the operator to take immediate corrective action (in addition to providing notification) when annulus pressure increases by more than 500 pounds per square inch. The same requirement should apply if pressure exceeds 80% of the API rated minimum internal yield on any casing string in communication with the fracturing operation. We suggest that BLM clarify what kind of corrective action should be taken. We believe the fracturing treatment should be immediately terminated, and the operator should perform diagnostic testing to determine what happened and how/if it can be remedied.

³² Proposed section 3162.3-3(i)(8) provides for submission of MIT results after fracturing as part of a Subsequent Report Sundry Notice.

³³ See also 78 Fed. Reg. 31654 (explaining that BLM received some comments stating that an MIT is not needed on every well, but that BLM decided not to change this requirement).

³⁴ Claudio Bruffato et al, From Mud to Cement: Building Gas Wells, *Oilfield Resources* (Autumn 2003), 63, available at http://www.slb.com/~media/Files/resources/oilfield_review/ors03/aut03/p62_76.ashx

³⁵ See DNV Recommended Practice, p. 34 (“The conditions of the well should be continuously monitored as for conventional natural gas wells.”).

C. *Ensure Adequate Assessment of Likely Fracture Propagation*

We appreciate the requirement in section 3162.3-3(d)(4) that the operator include the estimated fracture direction, length, height, distance from usable water, and propagation plotted on the well schematic and a topographical map. We agree with BLM that this information is necessary to properly evaluate the potential impacts of a hydraulic fracturing proposal. To ensure the accuracy of these estimations, we encourage BLM to require an applicant to collect geophysical and reservoir data to support a reservoir simulation model, and then to use those data to develop a high-quality 3D³⁶ reservoir model(s) to safely design fracture treatments. Hydraulic fracturing models should be maintained and run prior to each fracture treatment to ensure that fractures are contained in targeted zones. The 3D reservoir model should be used to ensure there is a sufficiently large vertical buffer between the base of the deepest freshwater interval in the area and the top of the maximum estimated vertical fracture and an intervening confining layer.³⁷

D. *Ensure Adequate Post-Fracturing Reports*

Proposed section 3162.3-3(i)(4) would require operators to report the actual, estimated, or calculated direction of the fractures. We recommend that operators be required to indicate whether predicted vertical and horizontal fracture propagation lengths submitted pursuant to section 3162.3-3(d)(4) were accurate and to explain any discrepancies. BLM should be notified immediately if actual vertical and/or horizontal fracture length exceeds the job design in a manner that poses a risk of water contamination.

We appreciate the proposed requirement in section 3162.3-3(i)(7) regarding certification of wellbore integrity, providing for a report on the monitoring of cementing operations and the CEL. We suggest that this requirement clarify that the operator must certify that fracture propagations did not intersect protected aquifers or nearby wells.

We appreciate the new requirement in section 3162.3-3(i)(1) (not present in the 2012 proposal) to report the true vertical depth (TVD) of wells. Reporting TVD in addition to measured depth will give regulators an accurate understanding of the vertical distance separating the fractured formation from formations which contain usable water.

V. **Water Protection**

We appreciate BLM's proposed expansion of protected water from *freshwater* (containing less than 5,000 parts per million (ppm) of total dissolved solids (TDS)) to *usable* water (containing less

³⁶ Ideally, the models would be "4D," with time as the fourth dimension.

³⁷ See DNV Recommended Practice, p. 31 ("it is essential that the actual fracture creation and propagation is monitored in real time using BAT micro-seismic arrays and methods that allow direct location of and indirect observation of subsequent induced fracture surfaces. The resulting observed induced fracture geometry, direction and extent should then be compared to values predicted for these. If there is considerable deviation between predictions and observations, any necessary model revisions, corrections and updates should be performed in time to improve the design, planning and execution of future fracturing operations.").

than 10,000 ppm TDS). This will help protect drinking water as well as water used for other purposes such as agriculture.

Proposed section 3160.0-5 lists four categories of zones that “are deemed to contain usable water”:

- (1) Underground sources of drinking water as defined by the U.S. Environmental Protection Agency or by State law (for Federal lands) or tribal law (for Indian lands);
- (2) Zones in use for supplying water for agricultural or industrial purposes, regardless of the concentration of total dissolved solids, unless the operator demonstrates that the existing agricultural or industrial user would not be adversely affected;
- (3) Zones designated by a State (for Federal lands) or a tribe (for Indian lands) as requiring isolation or protection from oil and gas operations; and
- (4) Zones containing up to 10,000 ppm of total dissolved solids that are not excluded by paragraphs (A), (B), or (C) of this definition.³⁸

BLM should clarify that water meeting *any one* of these categories must be treated as usable water under the regulations, even if it could meet an exception under one of the other categories, and even if it contains more than 10,000 ppm TDS. Without this clarification, an operator could decline to protect water based on a showing that agricultural users will not be adversely affected (category 2), even if EPA or a state or tribe has defined this water as drinking water (category 1).

A. Isolation of Usable Water to Prevent Contamination

We support the new paragraph (section 3162.3-3(b)) requiring that all fracturing and refracturing operations meet the performance standard in section 3162.5-2(d), which requires that operators must isolate all usable water and other mineral-bearing formations and protect them from contamination. Proposed section 3162.3-3(d)(2) would allow operators to base the depths of usable water aquifers on a “drill log from the subject well or another well in the vicinity and within the same field.” We are concerned that basing the depth on a different well “in the vicinity” may not result in an accurate prediction in nonhomogeneous or geologically complex areas; BLM needs to address this concern.

Section 3162.5-2(d) does not clarify how usable water must be isolated. We recommend that BLM require surface casing (and intermediate casing, if needed) be installed and cemented at least 100 feet below the base of usable water to provide for a margin of error.

B. Require Disclosure of Source and Quantity of Water

Fracturing operations use large quantities of water, and the public should be able to know where this water is coming from and whether it is being reused. We appreciate the proposed

³⁸ Proposed section 3160.0-5 then goes on to identify three geologic zones deemed not to contain usable water.

requirements in sections 3162.3-3(d)(4)(i) and 3162.3-3(d)(3) to indicate the total volume of fluids and whether water used in operations is “reused or recycled water,”³⁹ as well as the proposed requirement in section 3162.3-3(i)(2) to indicate the source and location of the water used in fracturing fluids.

VI. Importance of BLM Notification and Approval

We appreciate the proposed requirement in section 3162.3-3(c) to submit notice and obtain BLM approval of all proposals for hydraulic fracturing or refracturing activities, and to submit new notices in the event that new information becomes available or if previous approvals are more than five years old. We suggest that notice be required to specify the location of all wells where fracturing will take place. If this is not specified, and notice is submitted in the form of a Sundry Notice for a type well or group of wells pursuant to section 3162.3-3(d), the location of each well will not be clear.

We suggest that a copy of this notice be provided to well owners and residents within one-half mile of the wellbore trajectory, along with any local governments (including tribal governments) within 20 miles of a regulated well for subsistence purposes.⁴⁰ Notification should also be posted on BLM’s website. The notification should include the chemical disclosures discussed above in these comments and information on water quality and the timing of pre-testing and fracturing operations.

VII. Well Stimulation Other Than Fracturing Should Be Addressed in this Rulemaking

The revised proposed rule would change the scope of these regulations to apply only to hydraulic fracturing operations, and not to other “well stimulation” activities such as acidizing (a process used in California’s Monterey Shale). We suggest that BLM retain the scope established in the 2012 proposal.

All forms of well stimulation need to be regulated to ensure adequate chemical disclosure, mechanical integrity, and waste water handling. Narrowing the scope of regulation to exclude well stimulation other than hydraulic fracturing means that rules for these forms of stimulation will continue to be outdated, with insufficient protections for public health and the environment. Additionally, failure to regulate the corrosive and toxic acids used in acidization procedures poses

³⁹ See DNV Recommended Practice, p. 36 (“Whenever practicable, the operator should consider using water resources other than potable water or legally protected/protectable water resources for drilling and hydraulic fracturing ... Produced reservoir water and recycled flowback water shall be treated and reused in the shale gas activities if this is technically feasible at reasonable costs.”). Both DNV Recommended Practice and Wyoming’s regulations recognize that, if produced water is reused as a base fluid, naturally-occurring petroleum compounds or other impurities may be present. *Id.*; Wyo. Adm. Regs., Ch. 3, § 45(g). Any petroleum distillates found in produced water used as a base fluid should be fully disclosed.

⁴⁰ Idaho Administrative Rules at 20.055.01.m require companies to notify all home owners and water well owners within one-quarter mile of the oil or gas well, and all owners of a public drinking water system with a state-recognized source water assessment or protection area within one-quarter mile of the oil or gas well. Colorado’s rules at 305(e) also require advanced notice to landowners.

a risk to well integrity.

In recognition of these risks, the state of Wyoming regulates all forms of well stimulation. State approval is required to “acidize, cleanout, flush, fracture, or stimulate a well.”⁴¹ The application for a permit to drill must include a “[d]escription of the anticipated completion and stimulation program, including the base stimulation fluid and its source, the chemical additives and proposed concentrations to be mixed.”⁴²

VII. Additional Areas that BLM Should Address

The following chart summarizes the topics where BLM should develop additional regulations through future rulemakings.

Area	Suggested Additions
<i>Water Sampling</i>	<p>We are disappointed that BLM has decided not to require baseline water testing on the grounds that “BLM cannot authorize operators to enter non-Federal land to conduct baseline water testing.” The onus should be on the operator to obtain permission to enter non-Federal land for testing purposes. Operators should be required to conduct water sampling of nearby water wells prior to hydraulic fracturing in order to collect baseline data, and after hydraulic fracturing to verify that freshwater contamination did not occur. Baseline testing of nearby water wells should occur prior to fracturing, but not more than 90 days prior; and post-fracturing water well testing should occur within 90 days. Thereafter, testing should continue quarterly for a period of five years and then annually through year 20.⁴³</p> <p>If operators will not be conducting baseline testing, then BLM’s regulations should provide for a presumption that any water contaminated within the vicinity of wells resulted from the fracturing operator.⁴⁴</p>
<i>Water protection</i>	<p>While the proposed regulations require reporting on the water source, they do not regulate water use. BLM should consider implementing regulations to protect freshwater uses by preventing damaging levels of water use, particularly from fish-bearing water bodies.</p>

⁴¹ Wyo. Rules, Oil and Gas Conserv. Comm’n, ch. 3, § 1(a); see also ch. 3, § 45.

⁴² *Id.* at ch. 3, § 8(c)(ix)

⁴³ See DNV Recommended Practice, p. 23 (suggesting the following regulatory requirement: “assess the site specific groundwater contamination risk at the design stage, considering the local geology, and baselines study”); *id.* at 31 (“Sufficient knowledge of the pre-existing water quality of all groundwater formations and the depths of the main formation boundaries of those to be drilled through, should be collected as part of a baseline survey of site conditions before drilling, fracturing and production.”); *id.* at 28 (“Environmental monitoring shall be implemented during all relevant phases of shale gas activities (e.g., after the hydraulic fracturing stage, during production operations). . . . Topics to be included in the monitoring include but are not limited to: — groundwater quality— surface water quality . . .”).

⁴⁴ See, e.g. Pennsylvania Oil and Gas Act, 58 P.S. § 3218(c); West Virginia’s oil and gas law, W. Va. Code §§ 22-6-35.

<i>Flaring</i>	When natural gas is produced at oil wells with no pipelines nearby to carry the gas to a market, the gas is often flared off as a waste product. In some U.S. locations, gas associated with oil wells is flared from wells for months, or even over a year. ⁴⁵ Flaring wastes natural gas resources wherever it occurs and produces air pollutants that are detrimental to air quality and climate, including black carbon. BLM should limit flaring and venting to the smallest amount needed for safety, and require operators to implement technically feasible and cost effective gas control practices during hydraulic fracturing operations and during production from hydraulically fractured oil wells, ⁴⁶ including Reduced Emission Completions (RECs), also called “green completions,” wherever technically feasible. ⁴⁷
<i>Air Pollution</i>	Air pollutants associated with fracturing, including methane, volatile organic compounds, and nitrous oxides, can threaten human health at the local, regional and global level. BLM should work with the Environmental Protection Agency to ensure regional and local air quality standards are met. ⁴⁸ Operators should be required to monitor air quality prior to and following fracturing, and to use natural gas, rather than diesel, to power equipment.
<i>Chemical Storage</i>	All hydraulic fracturing chemicals should be stored in secondary containment, or in double-wall tanks. Chemicals, especially corrosive chemicals, can result in storage container leaks and spills to the environment. The best practice for chemical storage is to install secondary containment under storage containers, and to ensure containers are not in contact with soil or standing water. ⁴⁹

⁴⁵ Energy Information Administration, “Over one-third of natural gas produced in North Dakota is flared or otherwise not marketed.” *Today In Energy*, (Nov. 23, 2011), available at: <http://www.eia.gov/todayinenergy/detail.cfm?id=4030#>

⁴⁶ See DNV Recommended Practice, p. 26 (suggesting “implementing means to avoid venting and flaring at all stages by prevention or collection and export of hydrocarbon emissions. This includes hydrocarbon emissions from flowback water. Flaring should be preferred to venting.”).

⁴⁷ A green completion requires the operator to bring in gas processing equipment to the well pad to clean up wet gas, improving it to gas pipeline quality. Typically, portable gas dehydration units, gas-liquid-sand separator traps, and additional tanks are required. Most companies report a one-to-two-year payout for investment in their own green completion equipment, and substantial profit thereafter, depending on the gas flow rate. See Susan Harvey, *et al.*, *Leaking Profits, The U.S. Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Make Money by Preventing Methane Waste* (2012), at <http://www.nrdc.org/energy/files/Leaking-Profit-Report.pdf>.

⁴⁸ BLM has had success working with EPA to control air quality impacts in the Uintah Basin, Utah. See BLM, *Success Stories*, <http://www.blm.gov/wo/st/en/prog/more/soil2/air2/stories.html>. We encourage BLM to standardize this cooperation, similar to the way it has developed guidance on working with EPA to review Environmental Impact Statements (EIS) pursuant to Section 309 of the Clean Air Act (CAA). See Instruction Memorandum No. 2012-003, Environmental Protection Agency Review of BLM Environmental Impact Statements, http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2012/IM_2012-003.html.

⁴⁹ Bureau of Land Management, *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, The Gold Book*, 2007.

<i>Vertical Buffers for Hydrocarbon Zone</i>	Vertical fractures that extend above or below a hydrocarbon zone will decrease recovery rates by allowing vertical migration into the nearby strata, or by allowing water influx from permeable strata above or below the shale. The maximum vertical fracture should be less than the total vertical height of the hydrocarbon zone, leaving an un-fractured “vertical buffer” – at the top of the hydrocarbon zone and at the base of the hydrocarbon zone. This will provide a margin of safety at the top of the zone and the base of the zone to ensure fractures are confined to the approved formation to be hydraulically fractured. Buffer size should increase with geologic and technical uncertainty.
<i>Well Monitoring Post-Hydraulic Fracturing</i>	We recommend that BLM provide for more extensive monitoring post-fracturing, particularly during the first 30 days. Tubing and casing pressure along with all surface wellhead control system equipment should be maintained and tested at least quarterly to ensure pressure control is maintained throughout the life of wells.
<i>Corrosion and Erosion Control Program</i>	It is important to install a robust casing system and ensure that the integrity of the system is maintained throughout the life of wells. A successful program includes: (1) anticipation of corrosion in design factors of all equipment, (2) detection of corrosion and measurement of its severity for future reference, (3) use of mitigation measures, and (4) continual follow-up and adjustment of corrosion control techniques. We recommend that BLM require equipment to be designed to prevent corrosion and erosion. Monitoring programs should be required to identify corrosion and erosion over the well and equipment operating lifetime. Operators should be required to repair and replace damaged wells and equipment.
<i>Drilling fluid types</i>	BLM should work with EPA to require drilling fluids to be Water-Based Muds (WBM) containing only non-toxic additives ⁵⁰ or air drilling (where technically feasible and safe), and that Oil-Based Muds (OBM) and Synthetic-Based Muds (SBM) are prohibited. OBM contain diesel or other hydrocarbons. SBM use synthetic oil. SBM are less harmful than OBM, but still contain toxic materials that bio-accumulate and do not biodegrade. Diesel should not be permitted as a fracturing fluid.
<i>Risk of Induced Earthquakes</i>	Wastewater injection activities – many associated with hydraulic fracturing - in Alabama, Arkansas, California, Colorado, Illinois, Louisiana, Mississippi, Nebraska, Nevada, New Mexico, Ohio, Oklahoma, and Texas have induced seismicity at levels that are noticeable to the public. ⁵¹ We suggest that BLM consider the risk of induced seismic events in formulating regulations. The National Research Council provides suggestions on developing appropriate regulations to address induced earthquakes, regulations which are now under consideration in Illinois. ⁵²

⁵⁰ Any additives required for safe drilling through the groundwater interval with WBM should be limited to non-toxic additives that are biodegradable and do not bio-accumulate. See DNV Recommended Practice, p. 22 (suggesting the following regulatory requirement: “reduce the use of chemicals as much as reasonably feasible, in particular the use of persistent, biocumulative and toxic (PBT), carcinogenic and mutagenic chemicals”).

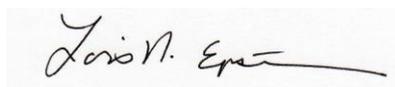
⁵¹ National Research Council, *Induced Seismicity Potential in Energy Technologies*, Advance Copy (June 15, 2012), available at <http://i2.cdn.turner.com/cnn/2012/images/06/15/induced.seismicity.prepublication.pdf>.

⁵² See *id.*; see also Mike Soraghan, Earthquakes: States deciding not to look at seismic risks of drilling, E&E (Mar. 25, 2013), at <http://www.eenews.net/public/energywire/2013/03/25/1> (noting that a 2012 National Academy of Sciences panel recommended that oil and gas regulators take steps to prevent man-made earthquakes); DNV Recommended Practice, p. 19 (suggesting the following regulatory requirement: “Seismic activity induced by hydraulic fracturing shall be monitored and reduced as far as reasonably practicable, in accordance with a risk assessment which takes into

Well abandonment	Proper well abandonment and remediation of the land should be ensured. ⁵³ BLM’s current bond amounts are woefully inadequate: \$10,000 for an individual lease, \$25,000 to cover all leases of a single operator in a state, and \$150,000 to cover all leases of a single operator nationwide. ⁵⁴ Since hydraulic fracturing operations require many more wells for equivalent production than conventional oil and gas wells, the bond amounts should be increased substantially.
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The Wilderness Society greatly appreciates your attention to these comments. If you have any questions, please contact Lois Epstein, P.E. at lois_epstein@tws.org, 907 272-9453, x107 or Barrett Ristroph at ristroph@tws.org, 907-342-9090.

Sincerely,



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Barrett Ristroph, Esq.
Arctic Program Representative

account possible human health and safety risks as well as the risk of damage to, e.g., buildings and other infrastructure.”).

⁵³ See DNV Recommended Practice, p. 34 (suggesting the following regulatory requirement: “The well shall be abandoned with an eternal perspective, where two barriers shall be required in order to prevent natural gas from flowing from the reservoir to aquifers or external environment.”); *id.* at 44 (“after abandonment of the area, all surface area and subsurface used for infrastructures shall be restored as far as reasonably practicable to pre-development conditions as stated in the baseline survey, or changed into alternative use as agreed with the surface landowner or other relevant stakeholders”).

⁵⁴ See BLM, Bonding, at <http://www.blm.gov/es/st/en/prog/minerals/bonds.html>; Oil and Gas Bonds: Bonding Requirements and BLM Expenditures to Reclaim Orphaned Wells

GAO-10-245 (Jan 27, 2010), available at <http://www.gao.gov/assets/310/300218.pdf> (noting that the bond amount for individual leases was set in 1960, while the statewide and nationwide bond amounts were set in 1951; for fiscal years 1988 through 2009, BLM spent about \$3.8 million to reclaim 295 orphaned wells in 10 states).