American Rivers - Center for Biological Diversity
Center for Health, Environment & Justice - Clean Air Task Force
Clean Water Action – Earthjustice – Earthworks - Environment America
Environmental Defense Fund - Natural Resources Defense Council
Nature Abounds – OMB Watch - Sierra Club – The Wilderness Society

March 7, 2012

The Honorable Bob Abbey
Director
Bureau of Land Management
1840 C Street, N.W., Room 5650
Washington, D.C. 20240

The Honorable Jeffrey Zients
Acting Director
The Office of Management and Budget
725 17th Street, N.W.
Washington, D.C. 20503

Re: Upcoming Revisions to BLM Regulation of Oil and Gas Extraction on Public Lands

Dear Director Abbey and Acting Director Zients:

We were pleased to learn that the Bureau of Land Management (BLM) is planning to propose new rules for oil and gas wells that are governed by federal leases. It is our hope that the BLM proposal will break new ground toward requiring oil and gas producers to use the best available practices to protect America's clean air, clean water, wildlands, and human health. As the largest manager of oil and gas resources in the United States, the BLM can—and should—be a model for all oil and gas operations.

New rules are essential at this point in time. People across the country are seriously concerned about threats to the environment and public health and local community disruption presented by oil and gas development activities, including hydraulic fracturing and other well stimulation techniques, but also risks associated with site development, well integrity, water and waste management, and air emissions—especially air toxics, ozone-forming pollutants and methane, a highly potent greenhouse gas. Many communities are adjacent to federal minerals leased by the BLM, which may be beneath public lands, national forests, national wildlife refuges, or private property. As you know, the BLM is responsible for 700 million acres of onshore subsurface mineral estate in 40 states throughout the nation, from California to Virginia, North Dakota to Texas. This acreage is roughly the size of Argentina. Millions of people live, work, and go to school near or even above these resources and expect the federal government to protect their health and safety, as well as their public lands, from the impacts of this industrial process.

Of course, some areas should be completely off limits to oil and gas development – including the most sensitive lands, such as proposed wilderness areas, and areas that support critical water sources. Likewise, safe setbacks are needed from homes, schools, and sensitive environmental features.

Where drilling does occur, the BLM should have rigorous, fully protective standards in place. The technology used in oil and gas production has evolved rapidly but, unfortunately, regulation has not kept pace. The BLM's rules are insufficient to protect public health and the environment. Interior Secretary Ken Salazar has recognized this, stating, "BLM's current regulations specific to hydraulic fracturing—or stimulation operations—are in many ways outdated; they were written in 1982; and they reflect neither the significant technological advances in hydraulic fracturing nor the tremendous growth in its use that has occurred in the last 30 years."[1] Improved regulation can reduce the risks presented by oil and gas development to clean air, clean water, wildlife habitat, and communities. Some in industry have moved to increasingly use such practices as green completions, wastewater recycling, closed-loop waste management systems, and the like, and have found that many of these approaches are economical to adopt. However, rigorous standards to improve environmental performance need to be set down in law to guarantee all operators are employing best practices wherever oil and gas development activities occur.

The BLM has an opportunity to lead the country toward a future where the oil and gas production industry develops these resources more responsibly—in ways that reduce threats to public health and the environment and that respect the quality of life in local communities. Our organizations and our members eagerly await the formal proposal of the BLM's new rules and hope they will reveal a new path toward safer and cleaner oil and gas operations.

As the Shale Gas Subcommittee of the Secretary of Energy Advisory Board stated in its final report, if action is not taken to reduce the environmental impact accompanying the very considerable expansion of shale gas production expected across the country, there is a real risk of serious environmental consequences. Yet the Subcommittee found that, although most of its recommendations are ready for implementation, there has been less progress than it had hoped.[2] Given all the recent information about the risks of oil and gas development, the public expects urgent and meaningful action from your agency.

Based on an unofficial draft that has been widely circulated, it appears the BLM will focus on three primary topics: disclosure of chemicals used in well stimulation techniques such as hydraulic fracturing, management of flowback fluid, and mechanical integrity. These are the right topics for the agency to be addressing at this time, and we urge you to consider the specific recommendations endorsed by many of our organizations, as outlined below. We also support adoption of strong standards to substantially reduce emissions of methane from oil and gas operations. Additionally, many more topics need to be urgently addressed to effectively manage

---

[1] Statement of Ken Salazar, Secretary of the Interior, Before the Committee on Natural Resources, United States House of Representatives: The Future of U.S. Oil and Natural Gas Development on Federal Lands and Waters. November 16, 2011.

[2] Secretary of Energy Advisory Board, Shale Gas Production Subcommittee, Second Ninety Day Report, November 18, 2011, page 10.

the full suite of risks posed by oil and gas development activities. As the stewards of America's public lands and natural resources, we urge BLM to ensure these new rules properly manage the environmental and public health risks associated with oil and gas extraction. Thank you for your consideration of these comments.

Sincerely yours,

William Robert Irvin, President
American Rivers

Kieran Suckling, Executive Director
Center for Biological Diversity

Lois M. Gibbs, Executive Director
Center for Health, Environment & Justice

Armond Cohen, Executive Director
Clean Air Task Force

Bob Wendelgass, President
Clean Water Action

Trip Van Noppen, President
Earthjustice

Jennifer Krill, Executive Director
Earthworks

Margie Alt, Executive Director
Environment America

Fred Krupp, President
Environmental Defense Fund

Frances Beinecke, President
Natural Resources Defense Council

Melinda Hughes-Wert, President
Nature Abounds

Katherine McFate, President and CEO
OMB Watch

Michael Brune, Executive Director
Sierra Club

William H. Meadows, President
The Wilderness Society

Regional Organizations

Erik Molvar, Executive Director
Biodiversity Conservation Alliance

Maya K. van Rossum,
Delaware Riverkeeper
Delaware Riverkeeper Network

Ernie Reed, Council Chair
Heartwood

Bob Cross, President
Ozark Society

Brent Walls, Upper Potomac Manager
Potomac Riverkeeper Inc.

Josh Pollock, Executive Director
Rocky Mountain Wild

Dan Randolph, Executive Director
San Juan Citizens Alliance

Patrick Sweeney, Regional Director
Western Organization of Resource Councils

Greg Costello, Executive Director
Western Environmental Law Center

Arkansas
Bill Kopsky, Executive Director
Arkansas Public Policy Panel
Arkansas Citizens First Congress

Gladys Tiffany, President
OMNI Center for Peace, Justice & Ecology

Vernon Bates, Chairman
Ouachita Watch League

Shawn Porter, Director
Ozark Water Protection Alliance

Terry Tremwel, Chair of the Board
Trem|Wel Energy, LLC

Shannon Hensley, Chairperson
URGE Coalition of Arkansas

California
Jeanette Vosburg, President
Ballona Network

Michael J. Painter, Coordinator
Californians for Western Wilderness

David Landecker, Executive Director
Environmental Defense Center

Patricia McPherson, President
Grassroots Coalition

Jeff Kuyper, Executive Director
Los Padres ForestWatch

John Horning, Executive Director
WildEarth Guardians

Colorado
Elise Jones, Executive Director
Colorado Environmental Coalition

Bruce Gordon, President
EcoFlight

Jeanne Bassett, Program Director
Environment Colorado

Gretchen Nicholoff, President
Western Colorado Congress

Sloan Shoemaker, Executive Director
Wilderness Workshop

Montana
Walter Archer, Board Chair
Northern Plains Resource Council

New Jersey
Doug O'Malley, Field Director
Environment New Jersey

New Mexico
Sanders Moore, State Director
Environment New Mexico

Oscar Simpson, Chair
New Mexico Sportsmen

Laddie Mills, Coordinator
San Juan Quality Waters Coalition

New York
David Van Luven, Director
Environment New York

Paul Gallay, President
Hudson Riverkeeper

North Dakota
Don Morrison, Executive Director
Dakota Resource Council

Ohio
Cheryl Johncox, Executive Director
Buckeye Forest Council

Julian Boggs, Advocate
Environment Ohio

Pennsylvania
Myron Arnowitt, Director
Clean Water Action

Erika Staaf, Clean Water Advocate
PennEnvironment

Texas
Luke Metzger, Director
Environment Texas

Utah
Scott Groene, Executive Director
Southern Utah Wilderness Alliance

Virginia
Kate Wofford, Director
Shenandoah Valley Network

David Hannah, Conservation Director
Wild Virginia

West Virginia
Judith Rodd, Director
Friends of Blackwater

Wyoming
Christina Denney, Chair
Clark Resource Council

John Fenton, Chair
Pavillion Area Concerned Citizens

Wilma Tope, Chair
Powder River Basin Resource Council

Linda Baker, Executive Director
Upper Green River Alliance

Laurie Milford, Executive Director
Wyoming Outdoor Council

CHEMICAL DISCLOSURE

CURRENT REGULATIONS

Disclosure of chemicals used in oil and gas extraction on federal lands is not required under current BLM rules. Onshore Oil and Gas Order #1 requires:

IV(e) Completion Reports. Within 30 days after the well completion, the lessee or operator must submit to the BLM two copies of a completed Form 3160–4, Well Completion or Recompletion Report and Log. Well logs may be submitted to the BLM in an electronic format such as ''.LAS'' format. Surface and bottom-hole locations must be in latitude and longitude.

Form 3160-4 does not, however, require the disclosure of hydraulic fracturing chemicals.[3]

RECOMMENDED REGULATIONS

BLM SHOULD REQUIRE PRE- AND POST-FRACTURE DISCLOSURE OF ALL HYDRAULIC FRACTURING CHEMICALS

The following should be made publicly available on a well-by-well basis through an online, geographically based reporting system, a minimum of 30 days prior to a hydraulic fracturing operation to afford local residents the time and information needed to conduct baseline testing of their air and water. This information should be submitted either with the application for a permit to drill, if available at the time, or as a sundry notice. The reporting database must allow users to search and sort data by chemical name, CAS number, operator, date, and geographic area.

1. Baseline water quality analyses for all protected water within the area of review[4]
2. Operator name
3. Proposed date of the hydraulic fracturing treatment
4. County in which the well is located
5. API number for the well
6. Well name and number
7. Latitude and longitude of the wellhead
8. Depth of all proposed perforations, reported as both true vertical depth and measured depth

---

[3] See, e.g. http://www.blm.gov/pgdata/etc/medialib/blm/ak/aktest/energy/og_forms.Par.62294.File.dat/3160-4_WellCmpltnRpt.pdf

[4] The area of review should be the region around a well or group of wells that will be hydraulically fractured where protected water may be endangered. It should be delineated based on 3D geologic and reservoir modeling that accounts for the physical and chemical extent of hydraulically induced fractures, injected hydraulic fracturing fluids and proppant, and displaced formation fluids and must be based on the life of the project. The physical extent would be defined by the modeled length and height of the fractures, horizontal and vertical penetration of hydraulic fracturing fluids and proppant, and horizontal and vertical extent of the displaced formation fluids. The chemical extent would be defined by that volume of rock in which chemical reactions between the formation, hydrocarbons, formation fluids, or injected fluids may occur, and should take into account potential migration of fluids over time.

9. Geologic name, geologic description, and top and bottom depth of the formation that will be hydraulically fractured
10. Proposed source, volume, geochemistry, and timing of withdrawal of all base fluids
11. Each proposed hydraulic fracturing additive[5] and the trade name, vendor, and a brief description of the intended use or function
12. Each proposed chemical that will be added to the base fluid, reported by the name and/or chemical compound and Chemical Abstracts Service (CAS) number
13. Proposed quantity of each chemical, reported as volume or weight percentage of the total fluid, as appropriate

The following must be made publicly available on a well-by-well basis through an online, geographically based reporting system, a maximum of 30 days subsequent to a hydraulic fracturing operation to ensure that local residents have the information they need should this information differ from the original plan. This database must allow users to search and sort data by chemical name, CAS number, operator, date, and geographic area.

1. Operator name
2. Actual date of the hydraulic fracturing treatment
3. County in which the well is located
4. API number for the well
5. Well name and number
6. Latitude and longitude of the wellhead
7. Depth of all perforations, reported as both true vertical depth and measured depth
8. Geologic name, geologic description, and top and bottom depth of the formation that was hydraulically fractured
9. Actual source, volume, geochemistry, and timing of withdrawal of all base fluids
10. Actual hydraulic fracturing additives used and the trade name, vendor, and a brief description of the intended use or function
11. Each chemical added to the base fluid, reported by the name and/or chemical compound and Chemical Abstracts Service (CAS) number
12. Actual quantity of each chemical used, reported as volume or weight percentage of the total fluid, as appropriate
13. Geochemical analysis of flowback and produced water, with samples taken at appropriate intervals to determine changes in chemical composition with time and sampled until such time as chemical composition stabilizes. The purpose of this is to aid operators and regulators in determining whether recycling is feasible and, if not, the most appropriate disposal method.

BLM should retain the right to request from the owner/operator or service company the chemical formula of each hydraulic fracturing additive in case of, for example, a health emergency or an investigation of suspected water contamination.

The bar for claiming and awarding trade secret protection of any chemicals must be set very high. We recommend an approach similar to that of the Emergency Planning and Community Right to Know Act (EPCRA). The core elements of such an approach include:

[5] A "hydraulic fracturing additive" is a chemical or chemical compound that is added to the base fluid and typically referred to by a generic name (e.g. biocide, viscosifier, friction reducer, etc) or trade name.

- The entity claiming trade secret protection must submit the information on a confidential basis to the agency.
- If the entity is claiming trade secret protection for a chemical identity, it must report the chemical family name associated with the chemical on the public disclosure website.
- When asserting a trade secret claim, the entity must submit substantiating facts in the form of the information required under 40 CFR 350.7(a), and shall include a certification by an owner, operator or a senior corporate official that is substantially identical to the certification language provide in part 4 of the form at 40 CFR 350.27.
- Any person may challenge a trade secret claim by filing a petition with the agency. The agency shall uphold the claim of entitlement to trade secret protection only if it determines the claim satisfies sufficiency requirements in the form of those required under 40 CFR 350.13.
- A trade secret claimant or a person challenging a trade secret may appeal an agency determination on the sufficiency or insufficiency of a trade secret claim by seeking review in U.S. District Court.

BLM can create provisions under its own authority that mirror those references from EPCRA, above.

Disclosure of chemicals used in the hydraulic fracturing process is only one of several areas of regulation pertaining to hydraulic fracturing that BLM should update. Others include requirements for the planning, design, operation, monitoring, and reporting of hydraulic fracturing operations.[6]

BANNING DIESEL IN WELL STIMULATION

CURRENT REGULATIONS

There are no current federal rules regarding which chemicals may be used for hydraulic fracturing. There are federal regulations applicable to hydraulic fracturing, however, when diesel is used. Fracturing where diesel is used is "underground injection" for purposes of the SDWA. 42 U.S.C. § 300h(d)(1)(B)(ii). A permit for diesel use may only be issued where the applicant demonstrates that "the underground injection will not endanger drinking water sources." 42 U.S.C. § 300h(b)(1)(B).[7]

RECOMMENDED REGULATIONS

BLM SHOULD BAN DIESEL AND RELATED PRODUCTS

BLM should ban the use of diesel fuel and related products in well stimulation. Diesel can contain carcinogenic compounds such as benzene, toluene, ethylbenzene, and xylene ("BTEX"). The Department of Energy Secretary of Energy Advisory Board Shale Gas Subcommittee found that, in light of these risks and the available alternatives, "there is no technical or economic reason to use diesel as a stimulating fluid."[8]

---

[6] See, e.g. NRDC Comments to U.S. EPA on Permitting Guidance for Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels http://docs.nrdc.org/energy/files/ene_11120901a.pdf

[7] Id

[8] Natural Gas Subcommittee, First 90-day interim report, (August 18, 2011), http://www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf

BLM should similarly examine other common or particularly hazardous chemicals and determine whether they should be categorically prohibited. While there is currently not an available methodology for assessing the toxicity of each chemical proposed to be introduced into a well and for determining less hazardous alternatives that are equally effective, BLM should coordinate with relevant federal agencies and research institutions (e.g. EPA, NIOSH, OSHA, CDC, NIH, etc.) to develop protocols for performing such analyses.

FLOWBACK MANAGEMENT

CURRENT REGULATIONS

Flowback is the term used to describe hydraulic fracturing fluids that return to the surface after a hydraulic fracturing operation is complete. Produced water is water that is trapped underground in geologic formations and comes to the surface when oil and gas are produced. While flowback is not explicitly regulated under current BLM rules, in practice flowback is likely currently managed under the rules pertaining to produced water.

The full suite of regulations pertaining to management of produced water is listed in Onshore Oil and Gas Order #7 (OOGO#7) with other pertinent regulations at 43 CFR 3162 and in Onshore Oil and Gas Order #1 (OOGO#1). Relevant provisions to the recommendations made in the following section include:

43 CFR 3162.5-1(b) The operator shall exercise due care and diligence to assure that leasehold operations do not result in undue damage to surface or subsurface resources or surface improvements. All produced water must be disposed of by injection into the subsurface, by approved pits, or by other methods which have been approved by the authorized officer. Upon the conclusion of operations, the operator shall reclaim the disturbed surface in a manner approved or reasonably prescribed by the authorized officer.

OOGO#7-III(A) All produced water from Federal/Indian leases must be disposed of by (1) injection into the substance [sic]; (2) into pits; or (3) other acceptable methods approved by the authorized officer, including surface discharge under NPDES permit. Injection is generally the preferred method of disposal.

OOGO#7-III(A) Unless prohibited by the authorized officer, produced water from newly completed wells may be temporarily disposed of into pits for a period of up to 90 days, if the use of the pit was approved as a part of an application for permit to drill. Any extension of time beyond this period requires documented approval by the authorized officer.

OOGO#7-III(D)(1)(b) The daily quantity of water to be disposed of (maximum daily quantity shall be disposed of (maximum daily quality shall be cited if major fluctuations are anticipated) [sic] and a water analysis (unless waived by the authorized officer as unnecessary) that includes the concentrations of chlorides, sulfates, pH, Total Dissolved Solids (TDS), and toxic constituents that the authorized officer reasonably believes to be present.

OOGO#1-III(D)(4) The Surface Use Plan of Operations must: Describe the access road(s) and drill pad, the construction methods that the operator plans to use, and the proposed means for containment and disposal of all waste materials;

OOGO#1-III(D)(4)(e) Location and Types of Water Supply: Information concerning water supply, such as rivers, creeks, springs, lakes, ponds, and wells, may be shown by quarter-quarter section on a map or plat, or may be described in writing. The operator must identify the source, access route, and transportation method for all water anticipated for use in drilling the proposed well. The operator must describe any newly constructed or

reconstructed access roads crossing Federal or Indian lands that are needed to haul the water as provided in item b. of this section. The operator must indicate if it plans to drill a water supply well on the lease and, if so, the operator must describe the location, construction details, and expected production requirements, including a description of how water will be transported and procedures for well abandonment.

OOGO#1-III(D)(4)(g) Methods for Handling Waste: The Surface Use Plan of Operations must contain a written description of the methods and locations proposed for safe containment and disposal of each type of waste material (e.g., cuttings, garbage, salts, chemicals, sewage, etc.) that results from drilling the proposed well. The narrative must include plans for the eventual disposal of drilling fluids and any produced oil or water recovered during testing operations. The operator must describe plans for the construction and lining, if necessary, of the reserve pit.

RECOMMENDED REGULATIONS

BLM should update its produced water regulations to explicitly include flowback fluid. In addition, BLM regulations for the handling of these fluids are outdated and therefore the following improvements should be made to reduce the risk of adverse environmental impacts associated with waste fluids.

USE OF PITS TO STORE OR DISPOSE OF FLOWBACK FLUID SHOULD BE PROHIBITED

Flowback fluid can contain hydraulic fracturing chemicals, salts, heavy metals, volatile organic compounds, hydrocarbons, and naturally occurring radioactive material (NORM)[9]. The use of pits and/or centralized surface impoundments to capture or dispose of flowback water can result in greater surface disturbance and higher risk of leaks and spills, which can result in groundwater or surface water contamination. Pits can also be a significant source of hazardous and toxic air pollution.[10]

The use of pits and/or centralized surface impoundments to capture or dispose of flowback water from Federal/Indian leases should be prohibited. Closed-loop systems should be used to collect flowback for treatment and reuse or transportation to a disposal facility. Sufficient tanks must be utilized to capture the entire anticipated flowback volume and be located within secondary containment.

A geochemical analysis should be performed on all flowback, including for all contaminants for which EPA has set primary and secondary drinking water standards, hydrocarbons, standard inorganic ions, NORM, and hydraulic fracturing chemicals. The results of such analysis should be used as a guide to determine the most appropriate disposal method.

---

[9] See, e.g.,
Otton, J.K,, 2006, Environmental aspects of produced-water salt releases in onshore and estuarine petroleum-producing areas of the United States- a bibliography: U.S. Geological Survey Open-File report 2006-1154, 223p.
U.S. Geological Survey, 1999, Naturally Occurring Radioactive Materials (NORM) in Produced Water and Oil-Field Equipment—An Issue for the Energy Industry, USGS Fact Sheet FS–142–99, 4p.
Alley, B., Beebe, A., Rodgers, J., and Castle, J.W., 2011, Chemical and physical characterization of produced waters from conventional and unconventional fossil fuel resources: Chemosphere, v.85, no.1, pp: 74-82.

[10] National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, 2009, Measurement of Emissions from Produced Water Ponds: Upstream Oil and Gas Study #1, 195p.

OPERATORS SHOULD DEVELOP AND IMPLEMENT WATER USE AND WASTE WATER MANAGEMENT PLANS

Proper pre-drill planning can aid in successful water use and waste water management. The requirement in Onshore Oil and Gas Order #1 that operators must, "...identify the source, access route, and transportation method for all water anticipated for use in drilling the proposed well," should be expanded to include water used for hydraulic fracturing in the proposed well.

Operators should submit to BLM a plan for cumulative water use over the life of the project. The plan should take into account other activities that will draw water from the same sources, such as agricultural or industrial activities; designated best use; seasonal and longer timescale variations in water availability; and historical drought information. Elements of the plan should include but are not limited to:

1. The anticipated source, timing, and volume of withdrawals and intended use;
2. Anticipated transport distances and methods (e.g. pipeline, truck) and methods to minimize related impacts including but not limited to land disturbance, traffic, vehicle accidents, and air pollution.
3. Anticipated on-site storage methods;
4. A description of methods the operator will use to maximize the use of non-potable water sources including reuse and recycling of wastewater;
5. An evaluation of potential adverse impacts to aquatic species and habitat, surface water, groundwater, and wetlands, including the potential for the introduction of invasive species, and methods to minimize those impacts;
6. Anticipated chemical additives and chemical composition of produced water, with particular attention to those chemicals that would hinder the reuse or recycling of wastewater or pose a challenge to wastewater treatment.

As part of the Surface Use Plan of Operations requirement to describe, "...the proposed means for containment and disposal of all waste materials," and the required Methods for Handling Waste, operators should submit to the BLM a proposed plan specifically for handling wastewater, such as flowback and produced fluids. Elements of the plan should include but are not limited to:

1. Anticipated cumulative volumes of wastewater over the life of the project, including what volume will be reused/recycled vs. disposed;
2. Anticipated on-site temporary storage methods;
3. Anticipated transport distances and methods (e.g. pipeline, truck) and methods to minimize related impacts including but not limited to land disturbance, traffic, vehicle accidents, and air pollution;
4. An assessment of currently available and anticipated disposal methods, e.g. disposal wells, wastewater treatment facilities, etc. This assessment must enumerate the disposal options available and evaluate the ability of those options to handle projected wastewater volumes. In the case of wastewater treatment facilities, the assessment must also evaluate the ability of those facilities to successfully treat the wastewater such that it would not pose a threat to water supplies into which it is discharged.

MECHANICAL INTEGRITY

CURRENT REGULATIONS

43 CFR 3162.4-2(b) After the well has been completed, the operator shall conduct periodic well tests which will demonstrate the quantity and quality of oil and gas and water. The method and frequency of such well tests will be specified in appropriate notices and orders. When needed, the operator shall conduct reasonable tests which will demonstrate the mechanical integrity of the downhole equipment.

RECOMMENDED REGULATIONS

BLM SHOULD REQUIRE MECHANICAL INTEGRITY MONITORING AND CORRECTION PLANS

Achieving and maintaining mechanical integrity are crucial to the protection of drinking water. Loss of mechanical integrity is a known or suspected cause of water contamination in oil and gas fields around the country, including in Bainbridge Township, Ohio[11], and Mamm Creek Field, Garfield County, Colorado.[12] As shown above, current BLM regulations are minimal and allow operators and regulators broad discretion on when and where mechanical integrity should be verified. BLM should update its regulations to provide clear, enforceable standards for mechanical integrity testing and verification.

Operators should be required to maintain mechanical integrity of wells at all times. Mechanical integrity should be periodically tested by means of a pressure test with liquid or gas, a tracer survey such as oxygen activation logging or radioactive tracers, a temperature or noise log, and a casing inspection log. The frequency of such testing should be based on site and operation specific requirements and be delineated in a testing and monitoring plan prepared, submitted, and implemented by the operator.

Mechanical integrity and annular pressure should be monitored over the life of the well. Instances of sustained casing pressure can indicate potential mechanical integrity issues. The annulus between the production casing and tubing (if used) should be continually monitored. Continuous monitoring allows problems to be identified quickly so repairs may be made in a timely manner, reducing the risk that a wellbore problem will result in contamination of USDWs.

Operators should also develop, submit, and implement a corrosion and erosion monitoring and correction plan. Well components such as casing, tubing, and cement can degrade over time due to contact with formation fluids, hydrocarbons, acid gas, treatment chemicals, and fine particles. Well stimulation (e.g. hydraulic fracturing), workovers, maintenance, seismic activity, and age can also contribute to degradation of well components. Such degradation can potentially lead to loss of mechanical integrity and therefore a monitoring and correction plan should be required.

---

[11] Ohio Department of Natural Resources, Division of Mineral Resources Management, "Report on the Investigation of the Natural Gas Invasion of Aquifers in Bainbridge Township of Geauga County, Ohio" September 1, 2008

[12] McMahon, P.B., Thomas, J.C., and Hunt, A.G., 2011, Use of diverse geochemical data sets to determine sources and sinks of nitrate and methane in groundwater, Garfield County, Colorado, 2009: U.S. Geological Survey Scientific Investigations Report 2010–5215, 40 p.

BLM SHOULD REVISE AND UPDATE WELL CONSTRUCTION REQUIREMENTS TO REFLECT TECHNOLOGICAL ADVANCEMENTS

Proper well design and construction are crucial first step to ensuring long-term mechanical integrity. Operators must demonstrate that wells will be designed and constructed to ensure both internal and external mechanical integrity. Internal mechanical integrity refers to the absence of leakage pathways through the casing; external mechanical integrity refers to the absence of leakage pathways outside the casing, primarily through the cement.

Casing must be designed to withstand the anticipated stresses imposed by tensile, compressive, and buckling loads; burst and collapse pressures; thermal effects; corrosion; erosion; and hydraulic fracturing pressure. The casing design must include safety measures that ensure well control during drilling and completion and safe operations during the life of the well.

The components of a well that ensure the protection and isolation of USDWs are steel casing and cement. Multiple strings of casing are used in the construction of oil and gas wells, including: conductor casing, surface casing, production casing, and potentially intermediate casing. For all casing strings, the design and construction should be based on Good Engineering Practices (GEP), Best Available Technology (BAT), and local and regional engineering and geologic data. All well construction materials must be compatible with fluids with which they may come into contact and be resistant to corrosion, erosion, swelling, or degradation that may result from such contact.

CONDUCTOR CASING:

Current BLM regulations:

None.

Recommended Regulations:

Depending on local conditions, conductor casing can either be driven into the ground or a hole drilled and the casing lowered into the hole. In the case where a hole is excavated, conductor casing should be fully cemented to surface. A cement pad should also be constructed around the conductor casing to prevent the downward migration of fluids and contaminants.

SURFACE CASING:

Current BLM regulations:

OOGO#2 – III(B)(1)(c) The surface casing shall be cemented back to surface either during the primary cement job or by remedial cementing.

OOGO#2 – III(B)(1)(e) All indications of usable water shall be reported to the authorized officer prior to running the next string of casing or before plugging orders are requested, whichever occurs first.

OOGO#2 – III(B)(1)(f) Surface casing shall have centralizers on the bottom 3 joints of the casing (a minimum of 1 centralizer per joint, starting with the shoe joint).

Recommended Regulations: