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BUILDING A SAFE, JUST, AND SUSTAINABLE WORLD SINCE 1992

SHAREHOLDER REBUTTAL TO THE ULTRA PETROLEUM OPPOSITION STATEMENT REGARDING HYDRAULIC FRACTURING RISKS

240.14a-103 Notice of Exempt Solicitation
U.S. Securities and Exchange Commission, Washington DC 20549

NAME OF REGISTRANT: Ultra Petroleum
NAME OF PERSON RELYING ON EXEMPTION: As You Sow Foundation
ADDRESS OF PERSON RELYING ON EXEMPTION: 311 California Street. Ste. 510, San Francisco, CA 94104

Written materials are submitted pursuant to Rule 14a-6(g)(1) promulgated under the Securities Exchange Act of 1934. Submission is not required of this filer under the terms of the Rule, but is made voluntarily in the interest of public disclosure and consideration of these important issues.

Proposal # 5—Report on Hydraulic Fracturing

A proposal filed by the Cedar Tree Foundation (represented by As You Sow) and the Green Century Equity Fund is centered on two concepts essential to investor confidence: disclosure and the mitigation of risks.

Shareholders are being asked to vote FOR a report on the short-term and long-term risks to Ultra Petroleum's operations, finances and gas exploration associated with community concerns, known regulatory impacts, moratoriums, and public opposition to hydraulic fracturing and related natural gas development. Such report should contain, at a minimum, with regard to hydraulic fracturing and related infrastructure: any substantial community opposition to the company's maintenance or expansion of particular operations, such as permitting and drilling; government enforcement actions, including allegations of violations; total aggregate government fines on an annual basis; facility shutdown orders, license suspensions or moratoriums on licensing, exploration or operations; any limitations which regional water supply or waste disposal issues may place on operations or expansion.

EXECUTIVE SUMMARY

- Hydraulic fracturing and its related operations above and below the ground have been linked to significant environmental, social, and health impacts that not only could have financial implications for the company but are also leading to increased community opposition and regulatory scrutiny which could have significant business implications.
- Ultra Petroleum has failed to provide little if any disclosure of the risks from community concerns, moratoriums, and public impacts despite media reports indicating that Ultra is likely exposed to such risks. Furthermore, there is wide spread evidence that bans, moratoriums, and public opposition have resulted in financial impacts that are being felt industry wide. Ultra's opposition statement and web site fails to acknowledge the industry-wide environmental impacts from hydraulic fracturing and its related operations and the chemical toxicity of fracking fluids.

- Ultra Petroleum has failed to provide little if any information on fines and enforcement actions despite having more than 200 alleged violations in the last five years in Wyoming and Pennsylvania. The company has one of the highest percentage rates of alleged violations per well in the Pennsylvania Marcellus Shale. In Wyoming, it has already spent tens of millions of dollars in mitigation efforts, with several million more still due, in response to its air emissions which have contributed to declining regional air quality standards.

- Ultra Petroleum misrepresents the regulatory landscape in both its opposition statement and on its website. Ultra has increased disclosure of regulatory concerns in its 10k and in virtually every case recognizes that regulations "which would result in more rigorous and costly management and disposal requirements," "could result in increased operating and compliance costs," "may result in increased costs, significant delays and the imposition of restrictions or obligations on the Company's activities, including but not limited to the restricting or prohibiting of drilling," "could require us to incur significant costs to monitor, keep records of, and report GHG emissions," "may adversely impact the value of the affected leases," "could adversely affect the marketability of the oil and natural gas the Company produces" - or similar language - yet the company claims that these do not pose any material risk to the company. The Bureau of Land Management and state agencies in Wyoming, Pennsylvania, and Colorado – the three states in which Ultra operates - have recently increased regulatory standards, fines or fees which all likely have business implications especially in light of Ultra's material impacts from previous and still pending violations, fines and mitigation efforts.
- Currently Ultra Petroleum is not providing investors the necessary information to determine if it is successfully managing the associated risks. Furthermore, Ultra Petroleum has not allowed shareholders to present the resolution at the annual meeting despite SEC regulations that require shareholders to attend the meeting to present the resolution, and Ultra management has refused shareholder requests to dialogue on this issue for more than two years despite the fact that many other companies have engaged in dialogue with shareholders over this time.

Rationale for a Yes Vote:

1. Hydraulic fracturing results in significant environmental, health, and social impacts, which are contributing to increased community opposition including bans and moratoria.
2. Ultra Petroleum's shareholders face significant financial risks due to tightening state and federal regulations.
3. Expectations around disclosure are shifting rapidly and companies and regulators are responding.
4. Ultra Petroleum's disclosure does not mitigate the associated risks and does not provide investors with sufficient information.

1. FINANCIAL RISK DUE TO COMMUNITY CONCERNS, BANS, MORATORIUMS, AND PUBLIC OPPOSITION TO HYDRAULIC FRACTURING AND RELATED NATURAL GAS DEVELOPMENT.

Ultra's opposition statement and public information fails to provide little if any information on the resolution's request regarding risk from community concerns, bans, moratoriums and public opposition.

Proponent response:
As the use of hydraulic fracturing skyrockets, communities, regulators and investors are growing increasingly concerned about the environmental, social, and health impacts of this process. According to an MSCI report, "the expansion of oil and gas activities into areas previously untouched by the industry will continue to face fierce opposition from the community, unless companies adequately manage environmental impacts and community health concerns through communication and adoption of best environmental practices."[1]

Ultra Petroleum controls 250,000 acres in Pennsylvania for drilling purposes, 100,000 newly purchased acres in Colorado, and 56,000 acres in Wyoming.

- In Pennsylvania over 100 municipalities in the state, including Pittsburgh enacted ordinances to restrict or limit hydraulic fracturing operations between March 2010 and September 2011.[2]
- At a packed public meeting in Pinedale, Wyoming, residents told regulators about their frustration with reduced air quality and implored state and industry officials to take serious action. According to one resident, "We used to have the best air in the whole damn country, and look at it now. Its gone way downhill, and it didn't start until industry started here — till you all moved in and started making money, and we're paying for it now. We're sick of it."[3] Ultra and other gas drillers have been repeatedly fined for air quality violations in the region.
- Ultra's recent entry into Colorado's Niobrara Shale has already been met with a moratorium and negative publicity. In September 2011, El Paso County imposed a four-month moratorium on new drilling permits in an effort to carve out time for officials to sort out land use regulations for the gas industry.

Global Hunter Securities analysts informed investors on December 1, 2011 that the ban was extended and expected to be in place through the end of May 2012. This ban covers acreage acquired in the area by Ultra Petroleum for $20 million just this past October. Elsewhere in the county Ultra holds leases on nearly 100,000 acres acquired in the summer of 2011.The analyst concluded that:

> Although this makes up a small portion of Ultra's position in El Paso County, we are watching this issue closely to see if the drilling ban is extended across the entire county or whether the county decides to work under the framework of the existing state guidelines. Regardless, El Paso County Niobrara development may proceed slowly in early 2012 despite the fact that there has been historic oil and gas drilling in the county.[4]

Colorado Springs is sparring with Ultra over 18,000 acres of Banning Lewis Ranch land that it bought out of bankruptcy for $20 million last year. Ultra wants the annexation agreement set aside and the land rezoned to agriculture, which would relieve it of costs associated with residential and commercial development.

The local Colorado Springs newspaper coverage reflects community apprehension. The Colorado Springs Independent highlights the company's history of alleged violations and fines and raises concerns about competition for limited water supplies in a front page special feature entitled "Frack happy Ultra Petroleum is the city's largest private landowner, what kind of neighbor will it be?"[5]

Another local paper also raises concerns about water use. Hydraulic fracturing is a water intensive drilling method using millions of gallons per frack, and wells can be fracked multiple times. This will put fracking in competition for water particularly in arid regions and agricultural communities. Colorado Springs' The Gazette interviewed water managers who expressed concern.

"Ultra contacted me some months back," said Roy Heald, manager for Security Water and Sewer. "I declined. I don't think we have sufficient supply to make that commitment and I don't know anyone here who does." Keith Hankins, a board member for Protect Our Wells, a group representing private well owners in the Denver Basin aquifer, said the amount of water needed for drilling is a concern. "As far as being nervous as far as water consumption goes, I am nervous about that and people should be nervous about that," Hankins said. "It's an unbelievable amount of water."[6]

The Gazette also raises concerns about the use of Colorado's disposal wells. It points out that one of the earliest links between earthquakes and the injection of frack water in disposal wells happened in Colorado in 1966, and that more recently a series of small earthquakes near Trinidad, Colorado may have been related to injection wells. Public opposition to a series of earthquakes in Ohio led to public opposition that led Ohio to limit the amount of fracking waste water that it would accept. This has impacted Pennsylvania Marcellus gas drillers who sent nearly 99% of fracking wastewater (22 million gallons) in the first six months of 2011 to Ohio, leading to a backlash from Ohio citizens, public, and regulators.[7] [8]

<u>Impact of Bans and Moratoria</u>
Bans and moratoria clearly have had implications on business prospects for other companies (below) but, given Ultra's current levels of disclosure, it is impossible for investors to evaluate such risks for our company.

- Both ExxonMobil and Chesapeake Energy were reportedly financially affected by the restrictions in Southlake TX.
    - In May 2011 the *Dallas Morning News* reported that "The anti-drilling movement is beginning to have an effect on the natural gas industry, which has had to slow down and even cancel some projects. XTO Energy, owned by Exxon Mobil Corp., halted plans to drill in Southlake, and after paying millions of

dollars to lease city land, now must wait for Dallas to rewrite drilling ordinances."[9]

- After the ordinance passed, Chesapeake reportedly sent out a letter to leaseholders stating the following: "The City of Southlake recently approved a new municipal ordinance regulating natural gas operation within the city limits. As a direct result of that ordinance, Chesapeake will not be seeking any permit approvals and will allow the last of our nearly 1,400 leases in Southlake to expire."[10]

- Royal Dutch Shell has estimated 40% of its New York acreage could be off-limits because of potential state rules.[11]
- In late October 2009, in the face of the massive public controversy about its plans to engage in drilling and hydraulic fracturing near the New York City watershed, Chesapeake Energy, reportedly the only company to hold leases within that watershed announced it would "voluntarily" refrain from drilling within the boundary. [12]
- Companies in New York State are exercising the "right" of force majeure, or "an unforeseen event that hinders the terms of the contract" to extend leases.[13] This is not a popular move with leaseholders and companies are facing two class action lawsuits in federal court representing 300 landowners.[14]
- Determining the impact of the Delaware River Basin Commission (DRBC) de facto moratorium has been very difficult. According to media reports, two companies operating in the region affected by the moratorium had "put their lease contracts on hold, citing a 'force majeure' clause that allows such suspensions because of regulation outside the 'normal and ordinary course of business.'"[15] According to other media reports the companies had invested more than $100 million into the leases before putting them on hold.[16]

An analysis of the impacts of these and other developments for our company would require the Company to analyze and disclose how particular developments may affect its operations. This would be required by the proposal, but the Company has not provided sufficient disclosure to fulfill this request on a region by region basis.

2. ENVIRONMENTAL, SOCIAL AND HEALTH IMPACTS WHICH ARE CONTRIBUTING TO COMMUNITY OPPOSITION

Enforcement and violations

Ultra's opposition statement *says "*it is committed to conducting its business in a manner designed to comply with all applicable environmental laws and regulations."

Proponent response:

The resolution specifically asks for information on: "government enforcement actions, including allegations of violations; total aggregate government fines on an annual basis; facility shutdown orders, license suspensions or moratoriums on licensing, exploration or operations." The Company provides little or no information on the above items. Yet state records show that the Company:

- Has been cited for 203 alleged violations at its Wyoming and Pennsylvania operations in the past five years for environmental and operational infractions dealing with wells, air quality and pollution of wetlands. Allegations included "improperly lined impoundments, lack pollution containing measures for polluting substances," and "no E&S [erosion and sediment control] plan available on site."
- Has spent and will continue to spend tens of millions of dollars in mitigation efforts.

Wyoming

- Ultra will pay, along with Shell, QEP and Encana, up to $72 million to mitigate high ozone levels in Wyoming. Ultra Petroleum, Shell, and QEP Resources paid a total $13 million to an air quality monitoring and mitigation fund in Pinedale, WY and are committed to eventually paying up to $36 million. EnCana has committed to contributing an additional $36 million.[17]
- In 2009, Ultra paid $200,000 in fines to settle eight air pollution complaints involving more than 100 wells dating to 2000. The settlement stemmed from Wyoming's allegations that Ultra had discharged hazardous emissions from its production facilities and failed to install the equipment needed to handle the emissions. Ultra was required to install $25 million worth of environmental equipment to prevent future pollution. To assure Ultra complied, the state required the firm to pay $105,417 for each month it was late in completing the installation. Lastly, the state required Ultra to pay $116,250 to the University of Wyoming Environmental Engineering Internship.
- Ultra has racked up 10 additional air quality violation allegations, which are pending.[18]
- Ultra placed five of its groundwater supply wells into the state's Voluntary Remediation Program, after tests by the Bureau of Land Management found higher-than-allowed levels of benzene, a fluid commonly used in fracking that can cause anemia or an increased risk of cancer.

Pennsylvania Marcellus Shale

- Ultra had the highest violations per new well in 2011. Ultra's 26 violations per well was far beyond the second worst average of 6.09 (XTO – Exxon) and third worst average of 2.13 (Cabot, tied with Rice Drilling). Thirty two operators had less than 1 violation per well and the average for all operators was 0.56 violations per well.
- In 2010, Ultra averaged 1.42 average violations per its 33 new wells that year which is still nearly double the 0.86 average of all 2010 operators.[19]
- Ultra received one citation for every four inspections — twice the area average.
- Over a four-year period, Ultra's compliance record of violations per well ranked it among the worst 20 percent of Marcellus Shale gas drillers.
- Had its erosion and sedimentation control permits revoked for four sites by the Pennsylvanian Department of Environmental Protection due to "numerous technical deficiencies." [20]
- Ultra is being sued by Citizens for Pennsylvania's Future (PennFuture), for air emissions violations. PennFuture alleges Ultra's facilities are emitting an illegal level of nitrogen oxides, which combine with other elements to form ozone. The PennFuture case could have significant consequences for all shale gas operators in Pennsylvania.[21]

Companies are increasingly facing enforcement actions and fines associated with the environmental impact of their operations. These violations contribute to community wariness of fracturing operations. Pennsylvania is one of the few states having a searchable database of drilling operation violations and enforcement actions. A new report, "Risky Business: An Analysis of Marcellus Shale Gas Drilling Violations in Pennsylvania 2008-2011," sums up the situation in the Commonwealth as follows:

> Using records obtained by the Pennsylvania Department of Environmental Protection (PADEP), the PennEnvironment Research and Policy Center identified a total of 3,355 violations of environmental laws by 64 different Marcellus Shale gas drilling companies between January 1, 2008 and December 31, 2011. Of these violations, the PennEnvironment Research and Policy Center identified 2,392 violations that likely posed a direct threat to the environment. Moreover, PennEnvironment believes these numbers offer a conservative view of environmental violations taking place across the Commonwealth by Marcellus Shale gas drilling companies. These data only include violations discovered by PADEP's enforcement staff. Yet based upon the number of wells drilled and limited PADEP enforcement staff, further violations that have gone undetected are likely.[22]

Pennsylvania is one of the few states publicly disclosing alleged violations. Investors believe that companies should themselves acknowledge violations and lessons learned, as Talisman Energy currently does, as a means of acknowledging and responding to public concerns. More importantly, since most states do not disclose such information, investors are largely left in the dark about companies' overall record of compliance and associated risk management practices making direct company disclosure a necessity.

Furthermore, tracking violations more closely can help companies manage and reduce problems. "When Chief Oil & Gas landed near the top of several lists – including the most fines of any Marcellus Shale drilling company in Pennsylvania – its leadership asked for a meeting with the head of the Department of Environmental Protection. Chief's operations leadership flew up from Dallas because 'they were not pleased,' recalled then-DEP Secretary John Hanger recently of that meeting last summer, 'they told me they were taking steps to improve their environmental performance, improving their control of water, improving their command and control on site.'"[23] Investors believe the above demonstrates that while it is valuable for states to make this kind of information available, it also clearly shows that companies should be tracking and disclosing this information directly.

Environmental, Health and Social Impacts

Ultra's opposition statement says it "believes hydraulic fracturing can be conducted safely and in an environmentally responsible manner."

Proponent response:
The litany of alleged violations and environmental impacts as described above suggests that the company has often not done so. Impacts from Ultra's operations include:

Wastewater

Companies conducting fracturing operations must manage millions of gallons of waste water—portions of fracturing fluids that return to the surface plus naturally-occurring formation waters brought to the surface during and following fracturing. This water contains highly toxic chemicals used in the fracturing process, naturally occurring radioactive materials, dissolved solids, and heavy metals. This waste must be stored, transported, treated, and disposed of, and/or recycled.

- Ultra was exposed in a 2011 front page New York Times story about the environmental impacts of fracking. The New York Times reported:
    - Ultra Resources sent 155,000 gallons of wastewater with high levels of radioactivity to nine different towns across Pennsylvania to be spread on roads to suppress dust. The water came from two gas wells in Tioga County and contained radium at almost 700 times the levels allowed in drinking water. With rain or the melting of snow or ice, drilling waste spread on roads could potentially wash into rivers and streams.[24]

Air quality

Natural gas drilling has resulted in declining regional air quality impacting human health. Ultra has been fined and forced to pay for mitigation for negative impacts resulting from its air emissions in Wyoming. As stated earlier, Ultra is being sued for air emission violations in Pennsylvania. Ultra is looking to develop operations in Colorado although air quality impacts from hydraulic fracturing have already been documented throughout the state.

- Ultra's largest numbers of gas wells are located in Wyoming, including many in Sublette County. The county has a population of less than 10,000 people. Thousands of gas wells have contributed to air quality that is worse than Los Angeles.[25] In 2009 the state failed to meet federal air quality standards for the first time in its history partly due to high levels of benzene and toluene from more than 25,000 natural gas wells, mostly drilled in the last five years.
- In Pennsylvania, Ultra is being sued by PennFuture for allegedly emitting large amounts of nitrogen oxides (NOx) into the air, creating serious health risks for anyone living downwind. In addition to being a main precursor for ground-level ozone, NOx is harmful to human health in its own right.
- In Colorado, air emissions from oil and gas operations were found to be contributing as much as 97% of the smog-forming compounds from stationary sources in some Colorado counties.[26] A recent report out of the Colorado School of Public Health documented that air emissions near fracking sites could pose health risks to individuals living in the surrounding communities. "According to the lead author of the report, "Our data shows that it is important to include air pollution in the national dialogue on natural gas development that has focused largely on water exposures to hydraulic fracturing."[27]

Water scarcity

Hydraulic fracturing is a water intensive drilling method using millions of gallons per frack, and wells can be fracked multiple times. This will be put hydraulic fracturing in competition for water

particularly in arid regions and agricultural communities. As described earlier, Ultra's entry into Colorado has raised local concerns and exacerbates a worsening situation.

- The Colorado Oil and Gas Conservation Commission projected a 35% increase from 2010 to 2015 in water use for oil and gas exploration and production which translates into roughly 4.5 billion gallons in 2010 increasing to more than 6 billion gallons in 2015.[28]
- This is in a region that is not expected to have enough water to sustain expected population and agriculture levels. In Colorado, drillers can lease water from municipalities and often have more financial resources to spend than other users.

Social impacts

An influx of outside workers and higher wages has led to inflation and in particular, skyrocketing housing prices which has impacted communities.

- Tioga County, Pennsylvania, a primary area of Ultra Petroleum operations, is smack in the middle of the drilling boom, yet homelessness has increased in the region. The vice president of a local shelter program states there has been a dramatic increase in the number of families affected and estimates that 75% of current Tioga residents with nowhere to live were displaced from their homes by gas workers. [29]

3. SAFETY CLAIMS

Ultra's opposition statement says that "The Company believes hydraulic fracturing can be conducted safely and in an environmentally responsible manner. Recent studies by respected authorities, including the U.S. Environmental Protection Agency, the Ground Water Protection Council, and the Interstate Oil and Gas Compact Commission, are in accord."

Proponent Response:

The Proponents believe that the company is misrepresenting the studies and organizational support that hydraulic fracturing is being done safely and in an environmentally responsible manner.

The Environmental Protection Agency (EPA)

The EPA is in the middle of a significant study evaluating fracturing impacts. Related studies and rulings, such as its New Source Performance Standards and New Emission Standards for Hazardous Air Pollutants that was released in April 2012, will force new levels of transparency on air emissions from natural gas drilling.

The 2010 EPA study

- In March 2010, the EPA launched a study to examine how hydraulic fracturing could impact drinking water; the final report is expected in 2014.[30] The EPA has begun testing a few high profile sites. Its preliminary findings from its first test in Wyoming showed a link between hydraulic fracturing operations and groundwater contamination. It currently plans to do additional testing at the site.[31]

The 2005 EPA exemption

- In most cases, the EPA regulates chemicals used in underground injection under the Safe Drinking Water Act.

- The 2005 Energy Policy Act, allegedly shepherded through Congress by former Vice President Dick Cheney, former CEO of Halliburton, stripped the EPA of its authority to monitor hydraulic fracturing. The New York Times has dubbed this the "Halliburton loophole" and legislators are strongly pushing to reinstate EPA authority. [32]

The Contested 2004 EPA report

- The 2004 EPA analysis that the industry often refers to as proving that hydraulic fracturing is safe was a literature review and there were no samples taken.[33]
- According to EPA chief Lisa Jackson "That study is widely cited as saying, 'see, that proves it's safe,' and I don't think that's a fair or accurate summation of that study. I think that's an overbroad reading. We need some data."[34]
- According to EPA employee and whistleblower Weston Wilson, the EPA's 2004 report was "scientifically unsound." He continues, "While EPA's report concludes this practice poses little or no threat to underground sources of drinking water, based on the available science and literature, EPA's conclusions are unsupportable."[35]
- Others at the EPA contend the report's conclusions have been over-applied. According to one of the study's three main authors, Jeffrey Jollie, "It was never intended to be a broad, sweeping study."[36]

<u>The Ground Water Protection Council (GWPC)</u>

The GWPC 2009 report looked at several practices (not just fracturing) and among its specific comments on fracturing fluids was "The best way to eliminate concern would be to use additives that are not associated with human health effects." In fact, the report's final recommendations regarding hydraulic fracturing are more aligned with that of the shareholder proponents than of Ultra's board. For example:

- Suggested Action 2a: "Comprehensive studies should be undertaken to determine the relative risk to water resources from the practice of shallow hydraulic fracturing." And "develop additional state regulations relative to the practice."
- Suggested Action 2b: "….states should consider requiring companies to submit a list of additives used in formation fracturing and their concentration within the fracture fluid matrix. Further, states that do not currently regulate handling and disposal of fracture fluid additives and constituents recovered during recycling operations should consider the need to develop such regulations.
- Suggested Action 2d**:** "Hydraulic fracturing in oil or gas bearing zones that occur in non-exempt USDW [Underground Sources of Drinking Water] should be either stopped, or restricted to the use of materials that do not pose a risk of endangering ground water and do not have the potential to cause human health effects (e.g. fresh water, sand etc...).[37]

Ultra's opposition statement says that "Hydraulic fracturing has been used safely over one million times in the decades since its first commercial use in the oil and gas industry."

Proponent response:

On a 2010 call with Ultra's CEO, proponents asked for data to support this claim of one million wells safely drilled (the same request was made of Exxon's CEO at the 2010 annual meeting) and none was forthcoming. Nor does this statement place modern hydraulic fracturing in context.

- The process was developed in the late 1940's but only recently became widely used. Like all technology, it has changed dramatically since then, such as the new types of chemicals now used.
- These new innovations now require that millions of gallons of toxic laced water are now used per frack instead of tens of thousands of gallons that were required in older, smaller operations.
- According to the industry, fracturing is used in 90 percent of operational wells today.[38]

4. REGULATORY RISK

Federal and State Regulations

Ultra's opposition statement says "hydraulic fracturing is subject to numerous and extensive regulations. State agencies charged with protecting public and private water supplies have, for decades, regulated oil and gas activities, including hydraulic fracturing. Moreover, federal agencies control any adverse impacts of hydraulic fracturing through the Clean Water Act (which protects groundwater from environmentally-harmful activities), the Safe Drinking Water Act (which prohibits pollution of drinking water, though it does not authorize regulation of injection of fracturing fluids), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Proponent response:
Information on regulatory impacts is one of the primary requests of the resolution. The proponents contend that the above statements 1) misrepresents the current level and effectiveness of state and federal regulations (i.e. hydraulic fracturing is virtually exempt from the specific federal regulations cited by the company) and 2) fails to recognize the rapidly shifting regulatory environment on both the state and federal level which can have significant financial implications for companies engaged in hydraulic fracturing.

Federal Regulations cited in Ultra's opposition statement:

- The **Safe Drinking Water Act** - designed to protect drinking water sources including above ground and below ground water. In most cases, the EPA regulates chemicals used in underground injection, however the 2005 Energy Policy Act stripped the EPA of its authority to monitor hydraulic fracturing (with the exception of the use of diesel in fracking fluids). The New York Times dubbed this the "Halliburton loophole," alleging that then Vice President Dick Cheney, formerly CEO of Halliburton (the largest maker of fracking fluid), shepherded this provision through Congress.[39]
- The **Clean Water Act** - regulates the release of pollutants into waterways. Amendments exempted oil and gas production from stormwater runoff permits and redefined sediment as a non-pollutant. Consequently, sediment run-off from well and infrastructure construction and operation into streams and rivers are not covered by the Act.
- **The Comprehensive Environmental Response, Compensation, and Liability Act** (CERCLA), better known as the **Superfund** law - makes companies liable for clean-up costs from releasing hazardous materials into the environment, yet several toxic chemicals on the Superfund list are exempted if used for oil and gas production, and natural gas itself is excluded as a hazardous substance.[40]

Other Federal regulations and actions

Hydraulic fracturing is in fact largely exempt from seven major Federal environmental laws. Along with the three listed above, the remaining four include:

- The **Clean Air Act** - sets limits for major pollution sources including aggregates from multiple smaller sources from one operator. Oil and gas wells are exempt from this aggregation which in essence eliminates reporting from fracking operations.
- The **Toxic Release Inventory** (TRI) requires most industries to report releases of toxic substances to the EPA, including chemical use, point and fugitive onsite air releases, water releases, on and off-site land releases, underground injection, transfers to a treatment, and waste management facilities. Despite their use of toxic chemicals throughout production, oil and gas facilities are not required to report to the TRI.
- The **Resource Conservation and Recovery Act** - governs the disposal of solid and hazardous wastes from the point of creation to transport to disposal. In 1980, Congress exempted oil field and natural gas production wastes and EPA eventually ceded authority to state regulation leaving fracking fluid and produced water unregulated under the nation's premier hazardous waste law.
- The **National Environmental Policy Act** (NEPA) ensures the federal government considers environmental impacts before undertaking any major federal action (such as oil and gas wells on BLM and public lands). The Energy Policy Act of 2005 stripped NEPA's strong requirements and replaced it with much narrower and weaker process for several oil and gas related activities. [41]

Shifting regulatory framework at the Federal level

Newly proposed federal regulations highlight the government's perception that current regulations are insufficient and need to be significantly strengthened. Congressional action poses regulatory risk to investors that could result in increased costs and disclosures.

- **FRAC Act:** In June 2009, the Fracturing Responsibility and Awareness of Chemicals Act—or FRAC Act—was introduced in Congress to reinstate the EPA's authority to regulate hydraulic fracturing under the Safe Drinking Water Act.[42] In March 2011, it was reintroduced in the House and Senate. Although it is not expected to move in the current congress, companies should acknowledge the potential for its future enactment.
- **Congressional Committee Review:** In February and May 2010 the U.S House Subcommittee on Energy and the Environment sent letters to 14 companies involved in hydraulic fracturing asking for increased disclosure on the chemicals used in the fracturing process and their potential impacts on human health or the environment. In July 2010, the committee sent letters to ten oil and gas producers to obtain additional information. According to the committee, "[t]his investigation will help us better understand the potential risks this technology poses to drinking water supplies and the environment, and whether Congress needs to act to minimize those risks."[43]
- **Department of the Interior requirements:** In February 2012, the Department of the Interior announced draft rules that would require natural gas companies to disclose the chemicals used in all fracturing operations on public lands. According to media reports the rules would require companies to disclose the "complete chemical makeup of all materials used."[44] According to the Secretary of the Interior, "those rules are common sense and if we do not move forward with that kind of program from the Department of the Interior, my own view

is that the failure of disclosure and failure of giving the American people confidence that hydraulic fracturing will in fact work will end up being the Achilles heel of the energy promise of America."[45] This would particularly affect companies operating on the vast amount of public lands in the American West such as Ultra and other gas companies in Wyoming and Colorado.

- **Environmental Protection Agency:** Currently, the EPA is taking a close look at fracturing and plans to draft rules requiring increased disclosure of the chemicals used in the process. In 2009, Congress requested that the EPA carry out a study on the "relationship between hydraulic fracturing and drinking water" and the Agency's Science Advisory Board encouraged the use of a "life cycle approach." In late 2011 the EPA announced its final research plan and confirmed that the initial research results and study findings will be released to the public in 2012 and the final report will be available in 2014.[46] At the same time, in response to a petition filed by Earthjustice, the agency will use its authority under the Toxic Substance Control Act to require companies to provide increased disclosure on the chemicals used in the fracturing process.[47]

State regulation:

State-level regulation is spotty and inconsistent and as a result, investors do not have confidence it is sufficient to protect shareholder value.

The US Department of Energy reports:[48]

- 21 of 31 drilling states surveyed have no regulations specific to hydraulic fracturing,
- 4 of 31 drilling states surveyed have detailed regulations guiding hydraulic fracturing,
- 10 drilling states surveyed require that fracturing chemicals be disclosed, and
- No states surveyed require that the volume of fluid left underground after fracturing be recorded.

Shifting regulatory framework at state level

In the last few years, some state regulatory agencies have responded to public pressure and enacted new regulations. Though there are variations among the states as to the level of chemical disclosure, and there are variations in the forms the disclosures take, the following states have recently updated their regulations to improve transparency: Arkansas, Colorado, Montana, Pennsylvania, Texas and Wyoming. Ultra's operations are primarily in Wyoming and Pennsylvania and it is exploring a large expansion into Colorado.

Pennsylvania

- Pennsylvania imposed more stringent standards for total dissolved solids meaning that companies are no longer able to dispose of the millions of gallons of waste water produced in fracturing operations at water treatment plants that discharge into rivers and streams.[49] This raises serious questions as to how companies like Ultra, will dispose of wastewater.
- Insufficient capacity for waste water disposal could potentially limit the development of fracking, especially in Pennsylvania which has few disposal wells. Of the almost 22 million gallons of wastewater that Pennsylvania's Marcellus shale operators sent to disposal wells in the first six months of 2011, nearly 99 percent went to Ohio.[50] This

included 93% of the water sent to the Youngstown, Ohio well that had to be closed after 11 nearby earthquakes that are linked to the disposal of waste water. Citizen and regulatory efforts are now being made to prevent Ohio from becoming a dumping ground. [51]

- Both Philadelphia and Pittsburgh have banned drilling within the boundaries of their drinking watersheds, sending a clear message of community concern.
- Impact Fees: In February 2012, Pennsylvania passed a bill imposing an impact fee on gas drilling companies to help cover the cost of fixing bridges and water and sewer plants, among other projects.[52]

Wyoming

- The Wyoming Oil and Gas Conservation Commission was the first to pass new rules requiring companies to disclose chemicals used in the fracturing process.[53]

Colorado

- Colorado's new chemical disclosure regulations, which go into effect in April 2012, will require more disclosure than other states. [54]

Given the myriad of state and federal agencies and regulators considering increased regulation of aspects of fracturing operations, investors contend companies must be preparing for this reality.

Fracking Fluid Disclosure, Content, and Quantity

This momentum at the state level clearly indicates that expectations around disclosure are expanding and increasing. We believe companies should respond to and stay on the cutting edge of this trend in order to maintain their social license to operate.

Ultra opposition statement says "Last year, the Company published extensive disclosure about hydraulic fracturing on its website … the Company also began participating in the Ground Water Protection Council's hydraulic fracturing registry at www.fracfocus.org, where it discloses the chemical composition of frac fluids it uses in the states where the Company has active operated programs (currently Wyoming and Colorado)."

Proponent response:
The Company's reference to posting "extensive disclosure" last year is misleading, as of March 20, 2012 the company had just one paragraph on fracking listed under the top issues section in its 11 page Government Affairs section. New information on hydraulic fracturing appeared on its website in April 2012, yet this information does not address the concerns identified in the shareholder resolution. Also confusing is Ultra's omission of Pennsylvania from its "active operated programs" (see below).

Ultra's participation on Fracfocus is highlighted in its opposition statement and on its website. Yet Ultra's posting on Fracfocus totals one well in Colorado, six wells in Pennsylvania, and 122 wells in Wyoming. According to Ultra's 10K, in 2011 alone "the Company participated in the drilling of 161 horizontal wells" in Pennsylvania, and "participated in the drilling of 235 wells in

Wyoming"[55] (out of Ultra's roughly 900 wells drilled in that state). Based on those numbers this leaves about 87% of the company's wells unaccounted for on Fracfocus.

Additionally, Fracfocus does not require full disclosure of chemicals used. Its standard disclosure is the Material Safety Data Sheets (MSDS) required by the Occupational Safety and Health Administration (OSHA). OSHA requirements do not cover a comprehensive list of chemicals of concern as it is specific for industrial accidents not groundwater monitoring and they often omit key data.[56] Disclosure exceptions are also made for proprietary information which is left to the company to define.

Fracfocus and Ultra's own website compares fracking chemicals to food processing products or general household products such as detergents or cooking oils as a way of showing how benign they are. Some of these, such as citric acid are fairly innocuous for human health, yet others are known or suspected carcinogens.[57] Natural gas drilling uses several hundred different chemical products that are comprised of hundreds of chemicals to meet the specific geological and operational needs of the site.[58] From this mix a smaller number of chemical compounds are used to meet the specific geological and drilling requirements of the well site. Toxic chemicals are used at every stage of drilling and collecting gas.

- An April 2011 report by the U.S. House Committee on Energy and Commerce on the chemicals used in hydraulic fracturing found that, "between 2005 and 2009, the 14 leading hydraulic fracturing companies in the United States used over 2,500 hydraulic fracturing products containing 750 compounds. More than 650 of these products contained chemicals that are known or possible human carcinogens, regulated under the Safe Drinking Water Act, or listed as hazardous air pollutants."[59] Naphthalene, xylene, toluene, ethylbenzene, and formaldehyde, for example, each used in a number of proprietary fracking solutions, are known or suspected human carcinogens. [60]
- A 2010 study by the Endocrine Disruption Exchange found 942 products containing 632 chemicals are used in natural gas operations. Further research on 353 chemicals found that at least 75% could have affect the skin, eyes, and other sensory organs, and the respiratory and gastrointestinal systems. Approximately 40–50% could affect the brain/nervous system, immune and cardiovascular systems, and the kidneys; 37% could affect the endocrine system; and 25% could cause cancer and mutations.[61]
- In 2008 a study in Colorado found at least 65 chemicals used by natural gas companies were defined as hazardous under the major federal statutes designed to protect against toxic contamination**.** If these chemicals were released from an industrial facility, reporting to the Environmental Protection Agency (EPA) would be required, and specific clean-up protocols prescribed.[62]

Fracfocus and Ultra's website also emphasize that chemicals only make up only 0.5 percent to 2% of frack fluid (Ultra is at the high end, listing 2.07% chemical content in its Wyoming operations[63]). While accurate, it is also misleading and underplays the associated risks because it fails to convey the enormous volumes of liquid used to fracture wells.

- In April 2011 a Congressional investigation reported that oil and gas companies, as part of their fracking process, injected hundreds of millions of gallons of hazardous or carcinogenic chemicals into wells in more than 13 states from 2005 to 2009 (fracking has grown exponentially since then).[64]

- The Environmental Working Group estimates the amount of diesel and petroleum distillates used in a single well is enough to contaminate 650 million gallons of drinking water.[65]

Given the significant quantities of water used and produced, the quantities of toxics present are very significant.

5. RESPONSE TO SHAREHOLDERS

Ultra's opposition statement says "the Company is committed to working with its stakeholders to address questions and concerns about hydraulic fracturing."

Proponent's response: Perhaps Ultra's management does not consider its shareholders as stakeholders despite a 42% vote in support of this resolution in 2011.

- Shareholders first approached the company on this issue in 2009. The company held one dialogue with shareholders at which time both the CEO and legal counsel agreed to post information on its web site regarding four topics of Safety, Fracking Fluids, Risk Assessment and Current Job Locations. The company failed to do so.
- Since that time Ultra management has refused all shareholder requests to dialogue for more than two years.
- Ultra management has not allowed shareholders to present the resolution at the annual meeting despite SEC regulations that shareholders must attend the annual meeting to move the resolution.
- Ultra management has refused to announce the vote results at the meeting despite (or because of) a 42% vote for the resolution - one of the highest votes ever for an environmental resolution.
- By comparison, around 20 companies have held dialogues with shareholders, 19 have faced resolutions and most have provided shareholders with enough information to have the resolutions withdrawn or not filed in the first place. In 2012, Ultra is just one of three companies where the resolution will go to a vote and is also one of only two companies (Exxon being the other) to face a resolution for three consecutive years.
- Shareholder concern about regulatory, legal, reputational and financial risks associated with the environmental, health, and social impacts of fracturing operations is obvious for all the reasons described in this paper, yet the Company has opposed all shareholder resolutions requesting information on these risks.
- Ultra stock, as of April 30, 2012, is about $19 a share – down 63% from $51/share a year ago and far below its $102 share price four years ago.
- Last Fall *Forbes* listed Ultra CEO Mike Watford as 10th among America's 25 Highest-Paid CEOs; his $43.7 million compensation toped that of the CEOs of ExxonMobil, Chevron, JPMorgan Chase and Goldman Sachs.[66]

6. CONCLUSION

The use of hydraulic fracturing in natural gas drilling has become highly controversial. Concern about water sources, toxic chemicals and wastewater has led to new regulations in several states and proposed federal legislation. Negative local impacts are straining community resources and generating opposition to fracturing operations. In this climate, companies risk increased regulatory and legal risks along with a significant increase in the proliferation of restrictions, bans, and moratoria in strategically important areas.

As a result, investors need more information to determine how companies are managing the community impacts along with the impact such opposition has had on its operations now and into the future. In the absence of meaningful disclosure, investors have no way of fully assessing the risks and rewards from investing in various companies in the energy sector, and are concerned about unpleasant shocks to shareholder value. Currently Ultra Petroleum fails to provide sufficient disclosure in this area. Ultra's history of violations and millions of dollars in fines and mitigation demonstrate that things can and do go wrong. As a result, we encourage shareholders to vote in support of this proposal calling on the Company to disclose risks to the company's operations, finances, and gas exploration associated with community concerns, known regulatory impacts, moratoriums, and public opposition to hydraulic fracturing and related natural gas development.

This is not a solicitation of authority to vote your proxy. Please DO NOT send us your proxy card; As You Sow is not able to vote your proxies, nor does this communication contemplate such an event. As you Sow urges shareholders to vote for Item number 5 following the instruction provided on the management's proxy mailing.

Appendix

7. INDUSTY-WIDE EXAMPLES OF FINANCIAL RISK DUE TO COMMUNITY CONCERNS, BANS, MORATORIUMS, AND PUBLIC OPPOSITION TO HYDRAULIC FRACTURING AND RELATED NATURAL GAS DEVELOPMENT

Public and political concern has reached a level where it is limiting natural gas drilling operations at local, national, and international levels, exposing companies to significant financial risk.

State and local actions

There has been vigorous action by state governments and at the local level to restrict and in some cases ban fracking operations from certain communities. For example,

- **New York:** New York State is revising its guidelines related to hydraulic fracturing and vocal and politically well-connected support for increased protections has emerged. New York City's drinking watershed lies under a portion of the Marcellus shale. Currently, the state is under a defacto moratorium while regulations are finalized.
    - Updated draft regulations were issued in September 2011 and the public comment period closed in January 2012, after an "unprecedented turnout" at hearings; final rules are expected soon.[67] While regulations are winding through the state process, more than 100 cities, towns and counties in New York have enacted various rules and restrictions, and in some cases bans.[68]
    - In February 2012, the New York State Supreme Court affirmed that two local governments had the authority to prohibit natural gas drilling within their borders.[69]
- **Maryland:** In June 2011, the state announced it would conduct a comprehensive study on the implications of natural gas drilling. Permits will not be approved before the completion of the study in 2014.

- **Pennsylvania:** Between March 2010 and September 2011 over 100 municipalities in the state, including Pittsburgh enacted ordinances to restrict or limit hydraulic fracturing operations.[70]
- **New Jersey:** The state has a one-year ban on drilling, though this action is largely symbolic since there are not significant quantities of gas in New Jersey, it is a voting member of the Delaware River Basin Commission discussed below.[71]
- **Texas:**
    - In Flower Mound, citizen pressure resulted in a 6-month moratorium (effective in June 2010) on pipelines and centralized waste facilities, and a 90-day ban on drilling permits and gas production. Moratoriums were repeatedly extended until July 2011, when a new ordinance took effect. The new oil and gas rules required 1,500-foot setbacks from residences, monitoring requirements such as water well testing, pre- and post-drilling soil sampling, air quality monitoring, the establishment of noise limits, and numerous other stipulations to reduce the impact on Flower Mound residents during gas drilling, hydraulic fracturing and production.[72]
    - The city of Southlake adopted a 180-day moratorium on new gas drilling permits[73] and extended the moratorium for another 120 days[74] while a new gas ordinance was created. The city now requires an 1000-foot setback from habitable structures and from the property line of schools and hospitals, prohibits earthen drilling pits, requires low toxicity drilling fluids, bans fracturing fluid waste ponds within city limits, bans drilling in environmentally sensitive areas,[75] and the ordinance was later amended to prohibit hydraulic fracturing during the summer months.[76] Southlake's restrictions on fracking operations have had a significant impact on companies operating in the region.

More than 150 local or state actions (resolutions or ordinances to ban or impose moratoriums) have been passed with respect to drilling and hydraulic fracturing. These actions have taken place in 13 states across the country.[77]

<u>Regional Action – The Delaware River Basin Commission (DRBC)</u>

The DRBC - a hybrid state/federal hybrid regulatory agency that includes the U.S. Army Corps of Engineers and the governors of New York, Pennsylvania, Delaware and New Jersey — imposed a moratorium on drilling in the Marcellus Shale while it revises its regulations limiting development in Pennsylvania. The commission was expected to come to a decision before the end of 2011 but that decision has been delayed and as of the time of this memo, there was no updated timeline for finalization.

- Two companies operating in the region affected by the moratorium had "put their lease contracts on hold, citing a 'force majeure' clause that allows such suspensions because of regulation outside the 'normal and ordinary course of business.'"[78] The companies had invested more than $100 million into the leases before putting them on hold.[79]
- In response to the commission's draft regulations, Chris Tucker, a spokesperson for Energy In Depth, a pro-drilling association said, "Unfortunately, while a lot of the words in here sound good, a lot of the numbers sounds like a swift kick to the stomach. I've never seen bonding and fee requirements this high. They very well might prove prohibitive."[80]

International Action

- **Canada**: In March 2011, the Province of Quebec instituted a de facto ban on hydraulic fracturing pending review by a committee appointed by the Province's Environmental Minister to determine if shale gas could be extracted in the region without impacting the environment. In April 2012, the committee recommended that the minister should not allow hydraulic fracturing even for research purposes.[81]
- **France:** In response to the potential environmental damage the process poses, the country has a nationwide ban in place. In October, President Sarkozy stated that "Development of hydrocarbon resources underground is strategic for our country but not at any price. This won't be done until it has been shown that technologies used for development respect the environment…"[82]
- **Bulgaria**: In January 2012, Bulgaria banned hydraulic fracturing and suspended Chevron's license to explore for shale gas in the country.[83]
- **Germany**: In March 2011, North Rhine-Westphalia's state government imposed a moratorium on shale gas drilling following pressure from environmental activists. In the Lower Saxony town of Lünne, there have been protests against hydraulic fracturing and calls for a moratorium on drilling activities there, too. Lünne's mayor, Franz Schoppe, has responded to the protests insisting there must be a thorough review of the shale gas extraction process."[84] On the national level, following large-scale protests against shale gas pilot projects in North Rhine-Westphalia and Lower Saxony Environment Minister Norbert Röttgen ordered a review into the environmental impact of shale gas production in Germany.[85] These developments are particularly impactful on ExxonMobil which holds major leases in the area.
- **South Africa:** The Government has stopped licensing fracking permits in the Karoo region while it reviews the potential impacts on the issue.[86]
- **Ireland:** In January 2012, the Clare County Council became the first local authority to ban fracking in the country. [87]

8. ENVIRONMENTAL, SOCIAL AND HEALTH IMPACTS WHICH ARE CONTRIBUTING TO COMMUNITY OPPOSITION

Concern about environmental, social, and health impacts from hydraulic fracturing and related operations have led to growing opposition, litigation, and regulatory risks. Key concerns include:

A. Environmental Impacts

Water

Water contamination from toxic waste water is at the heart of the controversy over fracking. Companies conducting fracturing operations must manage millions of gallons of waste water—portions of fracturing fluids that return to the surface plus naturally-occurring formation waters brought to the surface during and following fracturing. This water contains highly toxic chemicals used in the fracturing process, naturally occurring radioactive materials, dissolved solids, and heavy metals. This waste water must be stored, transported, treated, and disposed of. These operations pose numerous risks at every stage of this process.

Groundwater contamination

Millions of gallons of chemical laced water are pumped down a well to frack open rock. Between 20%-80% of fracking fluid is left underground. Industry is adamant that fracking takes place so

far below fresh water sources that fluid left underground cannot reach or contaminate groundwater.

Yet, British Columbia regulators contend that fracturing shale can open up longer fissures allowing fracking fluid left underground to eventually reach groundwater reservoirs. They have identified 19 "fracturing communication" incidents where new wells have met up with other wells that were not expected. There has been little US research to determine how fracturing may open pathways to groundwater.[88]

The University of Texas found groundwater contamination in conjunction with gas drilling but conclude that these problems are a result of conventional gas drilling techniques such as casing failures, poor cement jobs, and spills on the surface.[89] Poor cement jobs are perhaps the most important aspect for preventing groundwater contamination and one the industry still has difficulty controlling. As Ultra points out on its web site link, wells consist of several layers of steel casing, each of which is covered by an outside layer of cement to seal off any fluids or gas from leaking into the earth and migrating upward to water sources. Yet the Environmental Defense Fund estimates that one in ten wells have improper cement jobs (the most infamous example of an inadequate cement job contributed to the BP Deepwater Horizon oil spill in the Gulf of Mexico).[90]

Lawsuits alleging impacts to groundwater sources are moving forward in numerous communities.

- According to analysis done by Sedgwick LLP in September 2011, over three dozen fracking-related lawsuits had been filed, and ten of which were class action suits.[91]
- In December 2010, two lawsuits were filed in federal court alleging that Chesapeake Energy and Encana Oil & Gas operations contaminated property owners' water wells.[92]
- In September 2010, 13 families in Pennsylvania sued Southwestern Energy alleging that their drinking water was contaminated by the company's drilling operations.[93]
- In Colorado several years ago, EnCana reached a reportedly multi-million dollar settlement with a private landowner and was fined $266,000 by regulators for release of gas production waste and failure to protect water bearing formations.[94]

Such lawsuits consume company resources and also strain community relations. As a result, investors believe increased transparency in this area is necessary.

Wastewater - surface contamination

Between 20 to 80% of fracking fluid returns to the surface.[95] Wells continue to release 'produced water' which consists of saltwater, naturally occurring toxics, and radioactive materials.

Unlike groundwater, contamination of surface water is well documented.

- In April 2011, a Chesapeake Energy well in rural northern Pennsylvania spilled thousands of gallons of drilling fluid, contaminating a stream and leading officials to ask seven families who live nearby to evacuate as crews struggled to stop the gusher. [96]

- That same month, a federal judge issued a temporary restraining order against Chesapeake Energy in one of three pending cases that challenge widespread waste-dumping practices in northern West Virginia.[97]
- In September 2010, a Chesapeake Energy well caught fire and the company was issued a violation for "failing to prevent the release of natural gas and the potential pollution of waters of the state." The company's operations at the site were shut down temporarily.[98]
- In June 2010, a blowout at an EOG well reportedly spewed gas and wastewater for 16 hours and was described by the Pennsylvania DEP as an event that posed "a serious threat to life and property."[99] In response, the company was forced to shut down its operations in Pennsylvania for 40 days and pay $353,400 in fines.[100]
- Data from the Pennsylvania Department of Environmental Protection (DEP) shows that from January 1, 2009 to December 31, 2011 there were 1,927 violations against Marcellus Shale-related companies for a total of $3.5 million in fines.[101] (The DEP posts this information on its web site but does not inform the landowners of violations.)
- A June 2010 explosion at a well in West Virginia owned by Chief Oil and Gas injured seven workers. The West Virginia Department of Environmental Protection issued two notices of violation for improper well casing, as well as an order to cease operations until the company reviewed casing depths, instituted personnel trained in blowout prevention to oversee drilling at all times, and demonstrated an understanding of the causes of the blowout.[102]
- Blowouts are a rare occurrence, but subsurface blowouts appear to be under-reported.[103]

Storage

Once on the surface, wastewater is often kept in lined or unlined impoundment ponds that are susceptible to torn linings, storm runoff, or collapse. Impoundment ponds also pose risks of air pollution as do methane leaks from storing water in tanks. New York's proposed fracking regulations call for only allowing storage of wastewater in watertight tanks. In the Marcellus Shale several companies are moving to closed loop systems of fluids.

Treatment

Local municipalities' residential treatment facilities are not prepared for industrial waste (including high levels of salinity and other contaminates) nor for the quantities of water. The New York State Department of Environmental Conservation (DEC) raised concerns in 2009 regarding wastewater treatment and said it will not issue drilling permits until the companies demonstrate they are capable of adequately disposing of waste water. It listed three options for companies - having it processed at sewage plants in NY, trucking it to specialized treatment plants in nearby states, or injecting it underground.[104] According to an analysis of the 135 New York treatment plants in the DEC report, only a tiny fraction could or would accept Marcellus Shale wastewater, and only in small amounts. Of the 11 out-of-state plants, nine could not take more wastewater and two refused to respond. Of the six New York injection wells, only one was licensed to accept gas wastewater (which it uses for its own operations).[105]

Disposal

Insufficient capacity for waste water disposal could potentially limit the development of fracking, especially in Pennsylvania which has few disposal wells. Of the almost 22 million gallons of wastewater that Pennsylvania's Marcellus shale operators sent to disposal (injection) wells in the first six months of 2011, nearly 99% went to Ohio.[106] Ohio approved 29 permits for injection wells in 2011 (mostly for out of state water) after averaging about four a year for the past two decades. This included 93% of the water sent to the Youngstown, Ohio well that had to be closed after being linked to 11 nearby earthquakes. Citizen and regulatory efforts are now being made to prevent Ohio from becoming a dumping ground. [107]

Scarcity

Given the millions of gallons of water used for fracking, water scarcity is becoming an issue especially in more arid regions such as Texas, Colorado, and Wyoming. For instance, Texas is experiencing its worst drought since the late 1800's which has placed oil and gas operators in direct competition with other water users. Another burden in arid regions is that most water from residential and agricultural use is put back into local rivers and streams, while fracking involves waste water that needs to be removed from the hydraulic system.

Recycling

Disposal problems led to the industry to develop their recycling capacity. In the Marcellus Shale nearly every company now does some recycling of its liquid waste although these efforts vary greatly from 0.2% by Exxon to more than 90% by other companies[108] According to Pennsylvania regulators, even though companies are recycling substantial portions of their wastewater, more wastewater continue to be dumped into rivers because the number of drilling rigs continues to skyrocket.[109]

Air

While the primary concern about fracking has been its impact on water quality, there is a growing body of science identifying its impacts on air and climate that may also pose significant risks.

Air emissions are both deliberate and accidental. Companies vent out dissolved gas as fracking fluids are pumped out. Venting can go on for a month or more until gas production is fully up and running and is connected to a pipeline. [110] Air emissions also occur from leaks (fugitive emissions) from storage tanks, pipelines, and compressor stations (which pump natural gas through pipelines) and whose emissions alone include hundreds of tons per year of know pollutants such as nitrogen oxides, sulfur dioxide, airborne particulates, carbon monoxide and volatile organic compounds (VOCs).[111]

VOCs are chemicals that easily vaporize from liquid into gas. VOCs mix with heat and sunlight to create ozone. Ozone exacerbates asthma and other respiratory diseases.[112]

Air quality

As the number of natural gas wells has increased over the past decade, the contribution of natural gas extraction to declining regional air quality has created concern for residents in various states.

- Rural Wyoming known for its breathtaking vistas now has worse smog than Los Angeles

because of its boom in natural gas drilling.[113]

- Utah had a similar experience as 2011 wintertime levels of ozone in sparsely-populated eastern Utah were higher than in New York City. The Utah Department of Environmental Quality is studying if there is a link to the 10,000 oil and gas wells in that area. The peak ozone value was 139 parts per billion, which is 85% higher than the federal health standard.
- In Denver, air samples of what was expected to be urban smog, turned out to include methane from nearby gas fields. Natural gas wells in the area are losing about 4% of their gas to the atmosphere (not including additional losses in the pipeline and distribution system) according to the National Oceanic and Atmospheric Administration (NOAA) and the University of Colorado, Boulder. NOAA also found high concentrations of butane, ethane and propane in Erie, east of Boulder, where hundreds of natural-gas wells are operating.[114]
- Dallas-Fort Worth is the largest urban center in the Barnett Shale, and a report by Southern Methodist University found daily air pollution emissions from local natural gas drilling surpassed that of all motor vehicles operating in the nine-county Dallas-Fort Worth metropolitan area[115]
    - A May 2011 report concluded that by installing equipment to recover emissions in the area, natural gas companies could save up to $52 million annually.[116]
- Dish, TX has been called the Grand Central Station of the Barnett Shale. Town officials arranged for the Texas Department of State Health Services to come investigate effects the gas industry's emissions could be having on the residents' health.
    - In 2009, town officials spent 15% of the town's annual budget on an independent air quality test that found benzene, xylene, naphthalene, carbon disulfide, and other chemicals at elevated levels.[117]
- In Northwest New Mexico, the switch from drilling for oil to drilling for natural gas has brought more severe and more frequent odor incidents causing health effects in communities. Residents commonly report headaches, nausea, dizziness, and nose, eye and throat irritation during odor events.[118]

<u>Climate</u>

Natural gas is touted as a cleaner option to coal or oil and a bridge fuel to green energy. Most discussion on climate focuses on the need to reduce carbon dioxide and natural gas produces less carbon than coal and oil. Yet natural gas produces a much higher amount of methane than coal or oil. Methane is a more destructive greenhouse gas (GHG) as it traps heat at 23 times the rate of carbon dioxide. About 40% of US methane comes from natural gas and accounts for 19-44% of US GHG emissions.[119]

Methane

A Cornell study contends that shale gas contributes to global warming as much as coal, or even more so.[120] The study states that methane is lost from multiple sources including the wellhead, leaks from pipes, and from storage facilities during transport and delivery. Over a 20-year time line, these fugitive emissions may make gas one-fifth to twice as bad as coal from a GHG standpoint.[121] Another Cornell study supports an opposing view and the discrepancies in these studies highlight how much more research is needed to reach consensus on the GHG impacts of

methane emissions from natural gas. Hydraulic fracturing's GHG emissions may pose another set of regulatory risk.

CO2

Two recent studies challenge the idea of natural gas as a bridge fuel based on its carbon emissions. A UK study concluded that shale gas will not likely serve as a transition fuel as its lifecycle emissions of CO2 are still incompatible with the Copenhagen Accord and that urgent de-carbonization of the electricity supply is required. It further states that without a meaningful cap on GHG emissions, shale gas is likely to increase net carbon emissions and developing shale gas will likely delay zero carbon technologies. [122]

A study by the former chief technology officer of Microsoft and climate researchers from the Carnegie Institution for Science came to a similar conclusion. They estimated that switching all coal plants to natural gas over 40 years would generate half as much GHG per watt-hour of electricity, but that the impact on global warming would be negligible. They too point to the necessity of zero-carbon energy source and conclude that "rapid deployment of low-emission energy systems can do little to diminish the climate impacts in the first half of this century. Conservation, wind, solar, nuclear power, and possibly carbon capture and storage appear to be able to achieve substantial climate benefits in the second half of this century; however, natural gas cannot."[123]

Earthquakes

The injection of fracking waste water (brine) into disposal wells is believed to be the source of earthquakes in Ohio, Texas, Colorado, Arkansas, and Oklahoma. A link between injection wells and earthquakes was first identified in the 1960s. Yet it did not gain attention until recently as more cases occur due to the exponential increase in fluids being used for fracking and needing disposal. Injection wells can be drilled down more than 9,000 feet until it reaches porous material where fluids can spread across long distances for storage. It is believed that some of these fluids reach an existing geological fault that is already stressed and the influx of injection water allows it to slip.[124]

Agriculture and Wildlife

Farming / Ranching

Contaminated water and air has led to concerns about impacts on crops and the quality of dairy, meat, and fish products. Research is just beginning into the many reports of livestock illness, death, and stillborn and stunted offspring.[125]

- Alberta is the heart of Canada's oil and gas region and many farmers there report problems with their water. Few of these become public as companies make farmers sign confidentiality agreements in return for replacement of their water wells. In February 2012 the National Farmers Union in Canada called for a fracking moratorium.[126]
- An investigation of 24 cases in five states where ranchers linked hundreds of dead cows to fracking described a Louisiana farmer with two herds of cows, one with access to a creek where fracking wastewater was allegedly dumped reported 21 cows died from the herd with creek access while none of the other herd became ill or died. The study also cites problems collecting evidence due to incomplete testing, lack of full disclosure of

chemicals, and nondisclosure agreements when settlements have been reached between the companies and farmers.[127]

- A study on behalf of the American College of Veterinary Pathologists found that 30 sheep died or were euthanatized during a 21-day period following a 1-day accidental exposure to natural gas condensate. [128]
- Kansas has proposed legislation allowing fracking solid waste to be spread on fields without requiring a solid waste permit.[129] A surge in fracking in southern Kansas has led companies to look for cheaper ways to get rid of large quantities of waste. The alternative is hauling it to landfills and there is only one in the county that will accept fracking waste. The state has put a limit on spreading waste on fields that have chloride levels higher than 900 parts per million, or about two inches of material atop the soil, as high levels of chloride can damage plants, affect the taste of drinking water, and make it more corrosive to water pipes.[130]
- New York City food professionals have formed groups such as Chefs for Marcellus and are banding together to protect the city's foodshed.[131] This is complimented by Farmers Against Fracking which is organizing across the state. These are typical of the hundreds of grassroots efforts raising concern about hydraulic fracturing.

Wildlife

Water and air contamination also impact wildlife.

- Politically active membership organizations such as Trout Unlimited and National Wildlife Federation have opposed hydraulic fracturing due to reports of animals found dead near fracking operations or in nearby waterways, habitat fragmentation from well site and infrastructure construction, and gas drilling in protected areas such as state forests or federal lands (particularly out west).
- Biocides, used to control bacterial growth in drill pipes, have raised concern about impacts on aquatic life and oyster beds in Chesapeake Bay.[132]

B. Social Impacts

In communities across the country, there is growing concern that along with the environmental and health impacts of hydraulic fracturing operations, the process brings significant impacts on communities as well. In August 2011, the US Department of Energy Shale Gas Advisory Panel released a report where it found that two of four "major areas of concern" pertain to communities: "community disruption during shale gas production" and "cumulative adverse impacts that intensive shale production can have on communities and ecosystems."

Economic Impact

Communities, and even neighbors, are split between financial winners and losers.

- Higher wages also results in higher costs of living including inflation and, in particular, skyrocketing housing costs (fixed income residents such as the elderly are hit the hardest).[133]
    - In 2005, the average rent for a one-bedroom apartment in Willison, North Dakota was less than $500. In February 2012 it is more than $2,000.[134]
- Natural gas related businesses flourish while non-gas related business lose employees and struggle with higher costs. [135]

- Marketed as a job creator for decades to come, over-production has led to a 10-year low in gas prices forcing companies to cut back drilling operations. Residents and townships are weary of embracing a boom-bust economy for their community.
- Homeowners near drilling operations are concerned about falling home values and difficulties with mortgages. Law firms and NGOs have sprung up to help a growing number of landowners who are trying to get out of their drilling lease.[136] [137]

Roads and Infrastructure

Towns and rural roadways are built for local traffic not industrial operations. About a thousand large trucks are needed for just one fracking operation.

- The impact of tens of thousands of trucks and tankers on these roads is predictable - extensive road damage, a surge in traffic accidents, increased traffic noise, and pollution.
- One media report sums up the new situation in many communities as follows: "It's possible to travel through gas country without seeing many wells, which often are set back in fields and woods. It is not possible, however, to travel any distance at all without encountering the tankers, dump trucks, and pickups that make the natural gas industry go. Used to haul in water, supplies, and workers and haul our drilling wastes, the trucks are a constant reminder of new prosperity and a constant annoyance to locals. Work goes on around the clock, year-round."[138]
- Construction of processing and storage facilities and pipelines all add to an altered landscape and a changing feel for agricultural, rural, or suburban communities.

Social Discord

Fracking brings an influx of hundreds of outside workers.

- This has led to an increase in crime, drugs, and sexually transmitted diseases among other social ills.
    - "county and local governments have to cope with the cost of dealing with more people, more social service referrals and more crime—the latter due to the presence of hundreds of young, unattached men with money to burn. Police calls for service in Bradford County [PA], which has more Marcellus wells than any other in the state, are up 25 percent this year, the Associated Press reported."[139]
    - "In Pennsylvania's Bradford County, DUI arrests by state troopers are on track to rise 40 percent this year after climbing 60 percent last year…the number of sentences handed out for criminal offenses was up 35 percent in 2010…Sheriff Clinton Walters said his officers are handling about a 25 percent increase from last year in everything from warrants for people who fail to appear in court to protection-from-abuse orders. This flood of arrests is such that his office's van is no longer big enough to transport all the inmates at once from jail to court…"[140]
    - "In Sweetwater County, Wyo., where natural gas exploration boomed about a decade ago, the population increased from 37,600 in 2000 to 43,800 in 2010, and arrests for drunkenness, drugs and DUI more than doubled from 603 in 2000 to a peak of 1,535 in 2008, according to state figures."[141]
- A large population of temporary workers can raise tensions between existing residents and those they view as 'outsiders'. Communities are further split between those supporting fracking and those that don't.

- This sudden increase in population strains existing social services such as police, hospitals, and schools – often with corresponding financial burdens. [142]

In this climate, companies face a threat to their social license to operate as communities increase opposition to, or ban outright, fracturing operations.

C. Health Impacts

Allegations of negative health impacts from fracking combined with the industry's refusal to provide full disclosure of chemicals used is among the most contentious issues surrounding fracking. Studies have begun to look at the community health impacts from natural gas operations.

Chemical Contaminates

As stated earlier, millions of gallons of chemicals may be used over the life of a well.

- Many chemicals used by natural gas companies are defined as hazardous under the major federal statutes designed to protect against toxic contamination (as noted previously, gas drilling is currently largely exempt from these laws).
- These include known carcinogens such as benzene; possible carcinogens including ethylbenzene, acetaldehyde, and formaldehyde; and other compounds such as toluene and xylene that can cause other serious health effects.
- Chemical and natural contaminates are known to leak from a wide array of gas drilling operations including gas wells, impoundment ponds, condensate tanks, compressor stations, pipelines, and processing plants, as well as the exhaust of thousands of vehicles.

Illness

- Evidence in Texas, Wyoming, Louisiana, North Dakota, and Pennsylvania increasingly finds an alignment between worsening health metrics among neighbors of gas wells and related infrastructure. The onset of symptoms and drilling frequently coincided.[143]
- A Texas hospital system in six counties with some of the heaviest drilling (93,000 natural gas wells) said in 2010 that it found a 25% asthma rate for young children, more than three times the state rate of about 7 percent.[144]
- More than 250 New York doctors, health care professionals, and medical societies warned New York Governor Cuomo that the state failed to analyze public health impacts of hydraulic fracturing in its rush to approve permits for drilling. The Medical Society of the State of New York has called for a moratorium on natural gas extraction using hydraulic fracturing until scientific information on health impacts is available.[145]
- One of the nation's top scientists, Dr. Christopher Portier, director of the National Center for Environmental Health at the federal Centers for Disease Control and Prevention in Atlanta, called for more research to determine the possible impacts of shale gas drilling on human health and the environment. "Studies should include all the ways people can be exposed, such as through air, water, soil, plants and animals," according to Portier.[146]
- In a January 2012 conference on hydraulic fracturing, leading doctors called for a moratorium on drilling in populated areas until the health impacts of such operations were better understood.[147]

- In April 2012 the Institute of Medicine, a branch of the National Academy of Sciences, announced it will examine whether the process of hydraulic fracturing to extract natural gas from rock "poses potential health challenges,"[148]

Radioactive contamination

Fracking wastewater picks up natural occurring radium.

- Radium has been shown to cause liver, bone and breast cancers.[149]
  - Health problems can arise if it enters a persons' body by eating, drinking or breathing.[150]
  - Exposure can come from leaks, illegal dumping, and when wastewater is been sold as a deicer and dust suppressant on roads, which can potentially run off and contaminate water and enter the food supply.[151]
  - In Pennsylvania, Ultra sent 155,000 gallons of wastewater (with levels of radioactivity almost 700 times the levels allowed in drinking water) to nine different towns to be spread on roads to suppress dust.

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