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SCIENCE WARS AS CULTURE WARS: FRACKING AND THE BATTLE FOR
THE HEARTS AND MINDS OF WOMEN

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Arts in the
College of Arts and Sciences
at the University of Kentucky

By

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Lexington, Kentucky

Director: Dr. Shannon Elizabeth Bell, Professor of Sociology

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2014

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ABSTRACT OF THESIS

SCIENCE WARS AS CULTURE WARS: FRACKING AND THE BATTLE FOR THE HEARTS AND MINDS OF WOMEN

In this thesis, I examine how claims regarding the environmental and health impacts of hydraulic fracturing or “fracking” are constructed by industry advocates who promote the practice and environmental and social justice groups who reject it. More specifically, I examine the cultural underpinnings of the debate over fracking, and the prominence of gender as a central framing device in that debate. While the controversy over fracking is often presented as scientific or technical in nature, I maintain that it is as much a culture war as it is a science war. I demonstrate this by showing how both pro-fracking and anti-fracking groups mobilize cultural symbols and identities—motherhood, environmentalism, family farming, family values, individualism, and patriotism among them—in order to persuade the public and advocate for their positions. I contend that engagement with the cultural and ideological dimensions of those debates, including their gendered dimensions, is as important as engagement with its scientific and technical dimensions. Ultimately, I argue that a greater focus on gender contributes to our understanding of environmental risk more broadly, and to the field of environmental sociology as a whole. As such, gender deserves more scholarly attention within the field than it is currently receiving.

KEYWORDS: Hydraulic Fracturing, Fracking, Gender, Environmental Sociology, Social Justice

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INTRODUCTION

Hydraulic fracturing or “fracking” is an extraction technique that has rapidly increased natural gas production and potential in the United States, while also transforming debates about energy—particularly in the Appalachian region. The practice has garnered widespread media attention, fueled in part by Josh Fox’s 2010 documentary *Gasland*, which features sensational footage of water faucets spewing out flames in homes near fractured natural gas wells (Fox 2012a). Scientists, politicians, and environmental and social justice (ESJ) activists have raised concerns about the environmental and health impacts of fracking in recent years, leading to moratoriums in some communities and heated debates over the wisdom of the practice in others. These concerns have been countered by industry supporters, including scientists, politicians, and landowners who believe the practice is beneficial to the economy with relatively low environmental and health impacts. As battles between industry and ESJ groups over hydraulic fracturing have intensified, claims about its environmental and health impacts have come under increasing scrutiny by a wide range of players.

One interesting, and perhaps surprising, facet of the debates over fracking is the prominence of gender as a central framing device. Newspaper articles, blog posts, documentaries, scientific studies, political reports, and other sources relating to the impacts of fracking reveal the significant extent to which gender permeates the debates. Interwoven into the arguments over natural gas extraction and its impacts on land and people are stories about motherhood, child safety, economic security, family values,

family farms, and environmental stewardship. Alongside conflicting truth claims about fracking—i.e., claims about the environmental and health impacts of this practice that are ostensibly backed by scientific research—are conflicting stories about which experts can be trusted, which players are the most (and least) “objective,” which studies are the most “biased,” and whose knowledge should count as authoritative. From the health impacts of fracking on women and children to the role of women in the anti-fracking movement to the highly gendered images and persuasive techniques used by both industry groups and ESJ activists in order to bolster their claims, it appears as though fracking—and the larger debate over its impacts—has everything to do with gender.

In this thesis, I examine how claims regarding the environmental and health impacts of fracking are constructed by industry advocates who promote the practice and ESJ groups who reject it. I also examine how and why gender has become so prominent in these debates. Specifically, I ask: How is fracking framed as an environmental/ health problem or issue, and by whom? How do industry groups and ESJ groups frame and assess the economic, environmental and health impacts of fracking differently? What claims do they make about the safety and wisdom of the practice, and what kinds of evidence do they use to support their claims? What kinds of arguments and persuasive techniques—scientific and otherwise—do they use to convince others of their positions, and how are these arguments gendered? While I explore these questions in relation to a range of players, I pay particular attention to exchanges between two very prominent players who have been at the center of mainstream media debates over fracking: Josh

Fox (an anti-fracking activist and filmmaker) and Energy In Depth (the natural gas industry's primary front group).

More broadly, I examine the cultural underpinnings of the debates about the environmental and health impacts of fracking. While these debates are presented as scientific or technical in nature, I maintain that they are as much culture wars as they are science wars. This study makes contributions to our understanding of the ways in which debates over the environmental and health impacts of polluting industries are framed more generally, and the salience of gender to these debates. Ultimately, I argue that gender deserves more scholarly attention within environmental sociology than it is currently receiving. I suggest that feminist science studies scholars and feminist sociologists working in the Appalachian region in particular have much to contribute to our understanding of environmental risk, and to the field of environmental sociology as a whole.

LITERATURE REVIEW

This thesis incorporates scholarship from environmental sociology, feminist science studies, and Appalachian studies into a critical feminist analysis of hydraulic fracturing or “fracking” in the United States. While I am interested in the environmental and health impacts of natural gas extraction, this thesis is not about documenting those impacts. Instead, it is about the ways in which those impacts are constructed by industry advocates who promote fracking and ESJ groups who reject it. While it is important to investigate scientific and technical claims about environmental and health

impacts of polluting industries, I contend that it is equally necessary to investigate the cultural and symbolic processes by which those claims are created, circulated, and debated.

Feminist Science Studies, Environmental Sociology, and “The Social”

Following Donna Haraway and others, I start from the premise that nature (and human impacts on the natural world) cannot be understood in isolation from culture—or vice versa (Haraway 1989). Science studies scholars have long insisted on the importance of recognizing the complex interactions between nature and culture in shaping scientific knowledge and debates (Merchant 1996; Haraway 1991; Latour 1993). While fracking is obviously a real, material process with very real, material impacts, those impacts are also socially constructed. We cannot evaluate claims about these impacts in isolation from the political, economic, and cultural contexts in which debates over the practice are taking place. There is no neutral zone “out there” beyond cultural influence from which to evaluate such claims. The truth about fracking is as much a matter of storytelling and persuasion as it is a matter of science. In order to understand the impacts of fracking, we have to critically examine the stories we tell ourselves and each other about those impacts—including both popular and scientific stories.

Feminist science studies scholars have also demonstrated that the stories we tell about science and nature are shaped by and reinforce cultural values and societal power structures (Harding 1986; Schiebinger 1989; Longino 1990; Haraway 1997). They have

shown how gender shapes the metaphors used in science, the process through which scientific facts and findings are constructed, and the ways those facts and findings are disseminated and mobilized by scientists, industry elites, policy makers, social justice activists, journalists, and others (Keller 1985; Haraway 1989; Hubbard and Wald 1999; Fausto-Sterling 2001). Their work serves as a reminder of the ways in which nature and culture are intertwined, and the salience of social categories like gender in shaping our narratives about science, nature, and the environment. Because it is such a prominent social category and power structure in U.S. culture (and in other cultures as well, albeit in diverse ways), it is not surprising that gender would be a central framing device in the debate over fracking. Both environmental justice activists and industry advocates invoke gendered images, tropes, and strategies as they create and interpret facts, weave those facts into stories, and advocate for their positions. Here I argue that these stories are not just about fracking; they are deeply gendered stories about truth, objectivity, motherhood, family values, citizenship, and the American dream. Given the prominence of gender in these debates, I contend that evaluating truth claims about fracking requires us to take storytelling—and gender—as seriously as we take science.

Feminist science studies scholars have done just that, insisting on the necessity of examining how social location (race, class, and gender, for example) influences the stories we tell about nature and science. While feminist scholarship has undeniably been influential in science studies, as is the case in other disciplines, this scholarship is too often marginalized within the field. Prominent scholars in the field have often failed to engage with or adequately recognize the contributions of feminist studies scholars

(Harding 2008; Whelan 2001; Haraway 1992). Furthermore when they have been engaged, their work has often been misunderstood. For example Bruno Latour has argued that the focus on gender and race reifies problematic social categories that are themselves constructs, placing too much importance on the realm of “the social” and not enough focus on the agency of “nature” and nonhuman actors in the creation of scientific knowledge (Latour 1987; Latour 2004). Yet Latour seems unaware of the extent to which feminist science studies scholars have problematized these categories while still insisting on the importance of examining the stratifying impacts of science and technology. Furthermore, feminist science studies scholars have long insisted on the importance of recognizing the complex interactions between nature and culture, and between human and nonhuman actors, in shaping scientific knowledge (Merchant 1996; Haraway 1991). This tension is relevant to debates over the environmental and health impacts of polluting industries, because while social categories like “gender” and “race” are problematic social constructs, they are (like “nature” itself) social constructs with very real, material impacts and implications. Following Haraway and others, I contend that gender—far from being a peripheral or optional topic—is actually integral to our understandings of nature, environment, and health.

Environmental Sociology and Environmental Justice

This recognition of the inseparability of nature and culture also informs the social constructionist approach to environmental sociology. However, this approach has not

always been welcomed within this subfield of mainstream sociology. Indeed, some of the tensions within science studies are mirrored in this literature. Environmental sociologists examine the relationship between society and the environment; however, environmental sociology has defined itself in many ways in opposition to a social constructionist approach, favoring a more structural and materialist paradigm. Indeed, early scholarship in the field argued that it was sociologists' obsession with "the social" that had created challenges for thinking about nature and the environment, and that environmental sociology needed to distance itself from the focus on this realm (Dunlap and Catton 1978). Yet John Hannigan and others contend that environmental sociology has too often erred in the other direction, neglecting the significance of the social and the symbolic realm in shaping our understandings of—and relationship to—the natural world (Hannigan 1995). Hannigan argues for the importance of understanding how environmental problems are framed, what kinds of knowledge is produced about the environment and human impacts on the natural world, and how that knowledge is shaped and contested by different social actors. He insists that how those claims are constructed matters, and that the social constructionist tradition is especially well-equipped to address the processes by which that construction takes place. This thesis is situated within that tradition, with a specific focus on the gendered nature of those constructions.

Other literature within sociology has grappled with these questions, and with the issue of social stratification in relation to environmental problems in particular. In the past few decades, a vibrant environmental justice literature has emerged which

examines the differential impacts of polluting industries based on geopolitical and social location (Bullard 1990; Bullard et al 2007; Pellow and Brulle 2006; Pellow 2007).

Additionally, feminist scholars have demonstrated the salience of gender to environmental justice debates and the role of women as leaders in grassroots environmental justice struggles (Bell and Braun 2010; Bell 2013). While there have been moves in recent years to bridge the divide between materialist and constructionist paradigms in environmental sociology, however, gender has remained a marginal topic within the mainstream environmental sociology literature. Furthermore, while the field has started to acknowledge ways in which polluting industries reinforce patterns of social stratification, perhaps due to the tension between nature and “the social” within environmental sociology, the cultural and ideological dimensions of environmental justice struggles remain under-theorized. Some exceptions to this trend can be found in literature on the cultural and ideological dimensions of debates over extractive industries in Appalachia, discussed below. This thesis draws on that work in order to demonstrate the significance of gender not only in terms of differential impacts of polluting industries, but as a central framing device in debates over those impacts.

Feminist Analyses of Extractive Industries in Appalachia

Grappling with the environmental and health impacts of fracking requires an understanding of the social, political, and economic context(s) where natural gas extraction is taking place. While this process has been going on for a number of years,

particularly in the Barnett shale in the southwestern United States, fracking is increasing most rapidly in and around the Appalachian region through the development of the Marcellus shale. As such, it is important to place this study within the context of natural resource extraction in the Appalachian region more generally. There have been numerous studies in recent years about the social, environmental, and health impacts of extractive industries on Appalachian communities (Holzman 2011; Scott et al, 2005; McSpirit et al, 2007; Burns, 2005). Of particular interest here are those that address the processes by which the practices of extractive industries (particularly the coal industry) are legitimated and/ or challenged. For example, Bell and York (2010) examine the role of an industry front group, Friends of Coal, in influencing community reactions to the coal industry. They argue that the Friends of Coal campaign maintains community loyalties by constructing a community economic identity around coal in communities that have been economically dependent on coal extraction in the past. Drawing on Habermas' theory of communicative action, they argue that the public relations campaign orchestrated by Friends of Coal may be viewed as an example of ideology manipulation by the industry that attempts to "lure the public into identifying" with coal, in spite of its declining economic significance in the region (Bell and York 117).

Rebecca Scott covers related terrain in her study on citizens' understandings of and identification with the coal industry, and the practice of mountaintop removal in particular (Scott 2010). Scott examines how meanings about mountaintop removal are generated and circulated among diverse actors, and the material impacts of those meanings. For Scott, symbolic and discursive forces are as important as economic

concerns when it comes to understanding and challenging ending MTR. While she does not examine truth claims specifically, Scott's approach highlights the symbolic and discursive processes through which claims about the coal industry are circulated and legitimated. Similarly, this thesis examines how similar symbolic and discursive forces are operating in debates over fracking in and around the Appalachian region, and how they bear on debates over the environmental and health impacts of this extraction technique.

Alongside mainstream environmental sociologists and science studies scholars, I recognize the importance of engaging in scientific debates about nature and the environment in ways that move beyond a narrow "social constructionist" posture. However, with feminist science studies scholars and feminist sociologists, I also believe it is possible and necessary to do so without neglecting issues of social stratification, or relegating them to the margins of the conversation. To fully engage with and understand the environmental and health impacts of fracking, it is every bit as important to grapple with cultural and ideological dimensions of the debate as it is to grapple with scientific and technical aspects.

Drawing on all of these literatures, I examine how the environmental impacts of fracking are framed by various players, and how gender shapes those framings. I hope to demonstrate that far from being a peripheral concern, gender is actually integral in shaping our understanding of natural gas extraction and its impacts on land and people. I contend that understanding how gendered images and strategies are mobilized by

both industry groups and environmental justice activists is important not only in the analysis of the debate around hydraulic fracturing, but in the analysis of polluting industries generally. As such, I argue that gender deserves more scholarly attention than it is currently receiving within both mainstream sociology and science studies literatures.

METHODS

My primary method for analyzing these materials is situational analysis—a grounded theory approach developed by Adele Clark (Clark 2005). This approach, rooted in symbolic interactionism and social worlds theory, is used to analyze the processes through which new technologies are constructed, shaped, legitimated, and challenged through the interaction of various social actors (Clarke 2005). I focus specifically on interactions between industry groups and environmental and social justice organizations engaged in heated debates about the economic, environmental, and health impacts of hydraulic fracturing. The primary materials to be analyzed include research reports, press releases, newspaper articles, blog entries, documentary films, and other relevant materials circulated through these primary players. To identify relevant data sources for my analysis, I begin with the website for Energy In Depth.

Energy in Depth is a public relations campaign launched by the Independent Petroleum Association of America (IPAA) in 2009. A 2009 IPAA memo describes EID as “a state of the art online resource center to combat new regulations, especially with

regard to hydraulic fracturing” (Demelle 2011). As such, EID is on the front lines of the culture war over hydraulic fracturing. To find out how EID is using gender to promote its message about fracking, I searched the terms “gender,” “women,” “children,” “family,” and “breast cancer” on their website. These searches yielded over 200 hits. I skimmed these and identified 32 blog entries for which gender and family are central themes, and numerous others in which they are relevant, if not prominent. Taking these as a starting point, I identified reports, scientific studies, blog posts, newspaper articles, and other materials mentioned in the entries that are used by different players to support or reject the claim that fracking is safe. I also identified individuals and groups that are prominently featured in these articles, including scientists, teachers, and ESJ activists/organizations, and collected materials from their websites. These materials, totaling over 100 artifacts from a range of sources, are incorporated into my analysis as well.

Like other grounded theory approaches, situational analysis relies on memoing. Memos in grounded theory allow researchers to engage in conversation with themselves about their data. Clarke has developed a series of memos specifically designed to help the researcher think through the range of actors, social worlds, positions, and discourses that make up the “situation” under investigation. As part of this approach, I used a series of “situational maps” that lay out who the major players are, what social worlds they belong to, what kinds of positions are taken and by whom, and how they frame the issue of fracking. These memos revealed four areas of particular concern within those debates: water contamination, women’s health, children’s health, and animal health. I examine each of these areas and the claims made

by differently-positioned players within each, paying special attention to how gender is mobilized on both sides of the debate.

FINDINGS

After examining each of the four claims about the impacts of fracking, I identified a series of strategies used by both industry advocates and anti-fracking activists to make their case. These include *mobilizing mothers*, *questioning motives*, *challenging objectivity*, *appropriating activism*, and *invoking the economy*. Below I discuss how these strategies played out in relation to each of the four claims.

Claim 1: Fracking Causes Water Contamination

As noted above, documentary filmmaker Josh Fox brought widespread public attention to hydraulic fracturing with his 2010 documentary *Gasland*. This film portrays fracking as a destructive practice that harms the environment and threatens public health. Josh Fox, the protagonist in the film, sets out to find the “truth” about fracking in an effort to make an informed decision about whether to lease land from a family property in Pennsylvania to a gas company. After traveling around to places where widespread drilling is taking place, talking to residents who are disgruntled with the natural gas industry, and examining the positions of scientists, industry advocates, and environmental activists on the issue, Fox concludes that fracking is a bad idea and decides not to lease his family land for this purpose. *Gasland* portrays the natural gas industry in a negative (at times demonic) light, suggesting that industry advocates are

knowingly exposing people to environmental and public health risks, even as they deny these risks, in order to make a profit from the shale gas boom. The most dramatic and memorable scenes from the film (and those that have received the most media attention) are scenes where residents are able to light their water on fire—something Fox attributes to the migration of methane caused by fracking (Fox 2010a). In Fox's telling of the story, the truth is on the side of ESJ activists, and the natural gas industry is doing everything in its power to obscure or cover up that truth.

Gasland is an unapologetically activist documentary aimed at uncovering the hidden dangers of hydraulic fracturing which, while already disputed in some circles at the time of its release, had not yet gained widespread media attention. Fox changed that with his sudden emergence as a high-profile, banjo-playing activist hell-bent on revealing the hidden truth about an evil industry and its toxic impacts. Indeed, Fox appears in the documentary as the poster child for environmental justice activism—an earnest whistle-blower who aims to reveal the hidden truth about an evil industry. Despite this image, however, the anti-fracking movement that has emerged in response to these concerns has been largely led by women. As with other environmental justice movements, women have been at the forefront of efforts to halt fracking in their communities until or unless the practice can be proven safe. As I will discuss below, EID initially responded to Fox's claims, and to the growing anti-fracking movement, by disputing the science. Over time, however, they have increasingly engaged in a culture war that recognizes the importance of women in the debate—and mobilizing women

(and mothers in particular) to carry their message has been a central strategy in this battle over hearts and minds.

In immediate response to *Gasland*, Energy In Depth released a document called “Debunking Gasland” which challenged many of Fox’s claims on technical grounds (Energy In Depth 2010). One key claim the document takes issue with is the claim that methane in people’s water supplies is a result of fracking. EID points to naturally occurring methane from biological processes as the cause of the methane in water supplies that can be seen in the dramatic footage of faucets spitting out flames in the film. EID also differentiates between biogenic and thermogenic methane—the former originating close to the surface and the latter originating from deep beneath the surface. They contend that the methane found in wells near drilling sites is all biogenic and therefore unrelated to drilling. They also challenge claims of chemical exposure from fracking fluids. *Gasland* references increased levels of benzene and other chemicals found in blood, urine, and water in a community in Texas where drilling is widespread. EID counters with a report from the Texas Department of State Health Services stating that “biological tests...indicate that residents’ exposure to certain contaminants was not greater than that of the general U.S. population.” The same report also claims that elevated benzene levels can be attributed to smoking (ibid). EID paints Josh Fox as the one who is misleading the public with irrational fears based on bad science.

Fox quickly fired back with a document called “Affirming Gasland,” which responds point-by-point to EID’s attack on his film (Fox 2010b). He challenges their theories and studies, providing evidence from a different set of studies that support the claims made in *Gasland*. This series of exchanges between Fox and EID provides two very different interpretations of the scientific evidence regarding environmental and health impacts of fracking. Each side mobilizes their own experts and studies, and/ or interprets the same experts and studies in a manner that is consistent with and supportive of their own views on the subject. Because the science involves a fair amount of uncertainty, and because the studies that have been done on these impacts are so limited, it is easy for each camp to use the same data to support their claims. But these arguments about evidence are about much more than science. They are also about Fox and EID challenging each other’s authority and raising doubts about each other’s motives to their respective audiences. Hence EID refers to Fox as an “avant-garde filmmaker” making his “first real foray into the mainstream,” suggesting that his personal aspirations and desire for fame are driving his work. They also accuse him of intentionally misstating the law, mischaracterizing the process of fracking, and “flat-out making stuff up,” questioning his objectivity and his politics (Energy in Depth 2010). Similarly, Fox accuses EID of intentional “obfuscations, misleading spin on information, and attempts to shut down questions about their practices” (Fox 2010b). In short, more than a battle over the scientific evidence on the impacts of fracking, this exchange is part of a larger culture war between industry advocates and ESJ groups over how the

activities of the natural gas industry (among other industries) should be represented—and ultimately, how they should be regulated.

This culture war is also deeply gendered. This point is best illustrated by Energy in Depth's release of a documentary style promotional video called *Truthland* in 2012. The protagonist in *Truthland* is a woman and mother named Shelly DePue who, like Josh Fox, was offered the opportunity to lease her land to the natural gas industry. The trailer for the film begins by calling *Gasland* "grossly misleading." It goes on to state: "Someone must show they are wrong. Someone more powerful than a NY filmmaker. More powerful than mere experts. Yes, we need a mom" (Energy in Depth 2012c). In this statement and the film as a whole, EID pits Fox—whose designation as a "New York filmmaker" suggests he is an outside agitator with no real stakes in the game—against DePue, concerned mother and farmer who actually lives on the land where the drilling is taking place. The film opens with DePue sitting in her home with her children around her, talking about how important it is to her as a mother to investigate the "scary" claims made by Fox in *Gasland* before making any decisions about leasing her land. She then travels around the country talking to various experts, asking their opinions about claims made in Fox's documentary. One by one, the experts cast doubt on Fox's claims, and DePue returns from her trip confident that hydraulic fracturing is safe. In addition to the film itself, Energy in Depth has a page on their website dedicated to the story of *Truthland*. On this page, one can find out all about DePue and her adventures, as well as a summary of all the points made by the experts she consulted (Energy In Depth 2012c). While the message is partly about "debunking" what Energy In Depth views as

questionable claims about fracking by mobilizing counter-experts, it is also about creating a female-friendly image for the natural gas industry. As I will discuss below, given the prominence of women in the anti-fracking movement (as in environmental and social justice movements more generally), as well as concerns over possible impacts of fracking on women and children, industry groups have come to realize that winning over the public means winning over women.

Since the release of *Truthland*, opponents of fracking have taken issue with the film on numerous fronts. They note that the film was funded by the natural gas industry, and argue that the information provided in the film is misleading. They have also pointed out that DePue has had had some violations and problems in her own wells. In spite of scenes from *Truthland* in which DePue visits a drilling site to witness how strong and infallible cement casings are—an attempt to counter concerns by Fox and others that cement casings often leak and will eventually fail over time—at least one of the wells on DePue’s property is suspected of having a faulty casing (Marcellus-Shale.us 2012). In addition, some of her neighbors have sued WPX Energy, the company responsible for the construction of the wells, over methane contamination of their water (ibid). To ESJ groups, these issues appear to be a strong indictment of the industry and its message about the safety of fracking. However, industry groups are quick to challenge such a characterization by arguing that this is simply another example of anti-fracking activists spreading misinformation and alarmist accusations. The methane in DePue’s neighbors’ water, according to the industry narrative, is biogenic and therefore not the result of drilling. Furthermore, they argue that the notifications

given to these companies are routine, not major violations as suggested by fracking opponents, and show the problem will be fixed and that the regulatory process is working (Energy in Depth 2012b). WPX Energy argues that their casings were properly constructed and that the issues with the wells resulted from a mechanical problem (Legere 2012).

The media coverage of the dispute serves as a reminder of the centrality of gender as a theme in this debate. In a 2012 news story on the controversy between DePue and her neighbor, the headline reads: “Pennsylvania Grandmothers Star in Global Fracking Debate.” It reads:

Shelly DePue, who has four gas wells on her farm west of town, says fracking is safe and an economic boon. Tammy Manning, who lives across fields and forested hills a mile away, blames nearby gas drilling including DePue’s wells for threatening the health of her family. (Drajem 2012)

DePue herself has not responded to the specific claims made in the lawsuit, but maintains her faith in and support for the natural gas industry and hydraulic fracturing (ibid). This example illustrates the fact that the debate about fracking and water contamination is about much more than methane or cement casings. Both “sides” mobilize a range of images and cultural symbols alongside their scientific facts and findings, and those images and symbols are deeply gendered. Regarding the question of whether fracking causes water contamination, authority rests not only in which expert we trust, but which grandmother. Thus the gendered images and strategies used by both industry and activist groups, far from being peripheral to the debate, are central to it. In the case of *Truthland* (and through DePue), EID provides a female figure that can

appeal to women as mothers and protectors of their families and communities: a caring, responsible, pro-fracking mother. As I will discuss below, this figure is a response to anti-fracking women who draw on their role as mothers in their activist work. I will refer to this strategy as *mobilizing mothers*.

Claim 2: Fracking is Harmful to Women’s Health

One of the most straightforward ways gender enters in to debates over fracking is through the claim that the practice has negative health impacts for women. There has also been growing concern in recent years about the relationship between environmental pollutants and cancer in women—particularly breast cancer. This concern led to the passage of the *Breast Cancer and Environmental Research Act of 2008*, which required the Secretary of Health and Human Services to establish an Interagency Breast Cancer and Environmental Research Coordinating Committee (IBCERCC) to examine current research on breast cancer and the environment and make recommendations for future research directions on this topic (Interagency Breast Cancer and Environmental Research Coordinating Committee 2013). Because breast cancer research is so highly visible and politically charged in the United States, it is not surprising that the debate over the health impacts of fracking has focused in part on potential links between fracking and breast cancer.

The idea that fracking could be linked with breast cancer got some media attention after Peggy Heinkel-Wolfe wrote a piece for the Denton Record Chronicle in 2011 about cancer rates in the vicinity of the Barnett Shale—a hotbed of natural gas drilling in

Texas. She reported that according to data from the Centers for Disease Control, invasive breast cancer rates rose in six counties in that region in 2009: Denton, Hood, Johnson, Parker, Tarrant and Wise counties (Heinkle-Wolfe 2011). That same year, the Texas Commission on Environmental Quality did an inventory of emissions sources from natural gas production equipment in the Barnett Shale in Texas; the same six counties with increased breast cancer rates also had the most natural gas production equipment in use. This led Heinkel-Wolfe and others to raise questions about whether fracking pollutants could be linked to the spike. Heinkel-Wolfe's article did not conclude that fracking caused the spike per se. Her article included statements from a couple of different experts on cancer who noted the difficulties in pinpointing a single cause of any given cancer spike or cluster. Rather, she voiced concerns about the possibility of a link, and suggested that it was something that should be investigated further.

Documentary filmmaker Josh Fox, who brought national attention to fracking with his film *Gasland* in 2010, addressed this briefly in his follow-up documentary, *The Sky is Pink* (2012). In this short film, Fox briefly mentions Heinkel-Wolfe's article and suggests (more strongly than Heinkel-Wolfe herself) that fracking in the area is to blame for the cancer spike in those six counties (Fox 2012a).

Apart from this specific story showing a rise in breast cancer rates in those counties in Texas, some have raised a more general concern that chemicals used in fracking have been linked to breast cancer—putting aside the question of whether fracking can be definitively linked to any particular cancer cases. A central figure in the anti-fracking movement, particularly with regard to risks to women's health (and breast cancer in

particular), is feminist ecologist Sandra Steingraber. A cancer survivor who has written extensively on environmental hazards, Steingraber has been an outspoken critic of fracking and has served as a science advisor for several breast cancer research and advocacy groups, including Breast Cancer Action, National Action Plan on Breast Cancer, and California Breast Cancer Research Program. She notes that fluids used in fracking contain potentially harmful substances, and argues that these fluids should be publicly disclosed and more tightly regulated. Benzene, a known carcinogen, is among the chemicals that raise concerns about the safety and proper regulation of natural gas extraction, emission, and disposal processes. Steingraber argues that there is enough evidence of a potential link between fracking and breast cancer to warrant concern and a moratorium on the practice, in spite of the legal, financial and logistical challenges of conducting large-scale, reliable scientific studies to definitively prove the connection (Steingraber 2012b).

Such claims have not gone unchallenged by industry advocates. In response to these claims, a series of articles emerged questioning the purported link between fracking and breast cancer, taking particular aim at Josh Fox and other anti-fracking activists. For example, shortly after the release of *The Sky is Pink* in 2012, journalist Kevin Begos wrote a story for the Associated Press (which was quickly linked to Energy In Depth's website) with the headline "Experts: Some Fracking Critics Use Bad Science" (Begos 2012). The article suggests that anti-fracking activists like Josh Fox are using bad science in order to bolster their critique of the industry. While Begos' article makes the point that bad science can be used by both sides in debates over fracking, the

focus of the piece (as indicated by the title) is the misuse of science by environmental activists—particularly with regard to the purported link between fracking and breast cancer. To counter the claims made by Fox and others about the cancer spike in Texas, Begos cites a medical anthropology professor and an epidemiologist with the Texas Cancer Registry who state that they have not seen evidence of a cancer spike in the area. He also claims that the Susan G. Komen Foundation disputes the link between fracking and breast cancer, further discrediting the claim. Industry groups have widely circulated the article, using it as proof that anti-fracking activists are misguided and irresponsible in their statements about the link between fracking and breast cancer.

Energy In Depth has been especially aggressive in attacking Josh Fox and other environmental activists on the issue of breast cancer. One way they have done this is by suggesting that these claims are grounded in emotion rather than fact. On the heels of Begos' article, EID posted a blog entry on their website entitled "AP to Josh Fox: Actually, You're Wrong" (Energy in Depth 2012e). The blog points to the experts cited by Begos as the "real" experts who have "debunked" claims about public health impacts of hydraulic fracturing, and accuses environmental activists like Fox and Steingraber of being driven by "emotion rather than science" on the issue. In another blog entry, EID's Tom Shepstone describes Sandra Steingraber as "perhaps the most emotional of all anti-natural gas opponents on the battlefield over the last few years," adding: "She's certainly entitled, as a cancer survivor, to be as emotional as she desires, but she spends most of her time promoting herself as the modern day Rachel Carson"(Shepstone 2012). This way of framing the issue makes Fox and Steingraber

seem “soft” and emotional (read: feminine) because of their political commitments and personal battles. The underlying assumption is that they are less objective, and hence less trustworthy, than the experts cited by Begos.

This kind of challenge to critics’ objectivity—and hence, to their credibility—is one of Energy In Depth’s central tactics. While they sometimes challenge specific scientific claims about fracking (as with the critique of *Gasland* discussed above), their more common approach is to discredit critics on a personal level using insults and derogatory comments about their work and credentials. For example, EID’s Tom Shepstone describes Josh Fox in one blog entry as a “self-promoting charlatan” who spends his time “speaking to the Occupy Wall Street crowd about how to take down America,” while working on anti-fracking rants out of an office that is heated by natural gas (Shepstone 2011). In yet another entry, Steingraber is attacked for her strong and apocalyptic rhetoric:

[F]or those unfamiliar with Ms. Steingraber, she has described hydraulic fracturing in such calm and collected ways as the “tornado on the horizon” that will hamstring your ability to “ride your bike along country roads” (no, seriously). She also thinks hydraulic fracturing is a “human-rights crisis,” and that “If we mitigate [hydraulic fracturing] to kill fewer people, we’re still killing people.” Sounds like a disinterested scientist for sure! (Energy In Depth 2012d)

Interestingly, Shepstone attacks critics for straying from the science not by challenging their scientific claims, but by attacking their political views and tactics with equally charged political rhetoric. The purpose of such statements, of course, is not to engage with or challenge the claims made by Steingraber and Fox, but to paint them as biased

and discredit them on the basis that they are motivated by their activism, their emotions, and/ or their personal aspirations.

Critics of fracking respond to such charges by arguing that industry advocates are equally driven by personal interests and emotions, albeit different ones. The New York State Breast Cancer Network challenged the claims made by Begos and Energy In Depth about fracking and breast cancer by stating: “Begos makes a common and, yes, emotional error by putting the burden of proof on the victims of industry rather than requiring that industry actually answer all the questions necessary to prove that hydrofracking is safe”(Fox 2012b). Steingraber pushed back against the charge that her views were based on emotion rather than science when she made this statement addressed to the gas industry:

Your representatives follow me around to speaking events across the state and post reports about me. You’ve commented on my make-up, my emotional life, my cancer diagnosis, and the size of my house... Memo to the gas industry: I am a biologist. I will debate you on the public health effects of fracking any time, anywhere. (Steingraber 2012a)

Fox also takes the industry to task for dismissing concerns about environmental and health impacts as based on emotion rather than science. In *The Sky is Pink*, Fox poses the question: “How can you separate the science from the emotion? In this case it is the science that provokes the emotion. It’s the science that tells us how to feel” (Fox 2012a).

Another moment from *The Sky is Pink* illustrates the way industry and ESJ groups mobilize gendered images and symbols in order to support their claims. In this film, using ominous music and damning statements about industry interests obscuring the truth about fracking, Fox paints a picture of an industry that is willfully poisoning people and land and then covering up their actions with cheap publicity stunts. At one point in the film, the voiceover states: “In Texas, as throughout the United States, cancer rates fell — except in one place— in the Barnett Shale.” Fox goes on to state: “The gas industry’s response was a pink drilling rig. Maybe they think the sky is actually pink, and they’re just trying to blend in. You just can’t make this stuff up” (Fox 2012a). Here he is referring to a pink drilling rig that was used to raise money for breast cancer research in 2010. While Fox may be right that the pink rig was an attempt to put a healthy and women-friendly face on the industry, it was not a response to the discussion about a possible breast cancer spike in the Barnett Shale area. In fact, that report came out a year after the pink rig was erected. Here and throughout the documentary, Fox caricatures the industry as uncaring thugs who exploit women’s issues while poisoning their bodies, just as *Energy In Depth* caricatures Fox and Steingraber as emotional activists with an ax to grind. While both sides at times use science to argue their points, just as often they support their claims by casting doubt on their opponents’ commitments and motives.

So which side is “right” about breast cancer and women’s health? In truth, the link between fracking and breast cancer has not been definitively proven or disproven. Indeed, both ESJ and industry groups are aware that more research would be required

in order to answer that question with any degree of certainty. Industry advocates predictably downplay the possible connection, such as the fact that fracking fluids contain some carcinogens, by pointing to the low levels of these chemicals and the impossibility of separating the effects of fracking from other sources such as cigarettes. ESJ groups err in the other direction, reading studies that link those chemicals to breast cancer as a clear indictment of the industry. But given that both sides recognize the limits of the science, where they differ most is on how the industry should proceed in the meantime. As noted above, Steingraber and others believe fracking should be halted until it can be proven safe, while industry groups believe it should continue unless proven unsafe. Unfortunately, it is extremely expensive to carry out the kinds of large scale studies that would be needed to address the question in a (scientifically) robust and meaningful way. Given the lack of funding for such studies, the fight over the “true” impacts of fracking on women’s health is in many respects more a public relations war than a science war. It is a battle of interpretation and persuasion, in which both sides try to generate the most compelling stories based on the same limited facts. And in this case, *questioning motives*, *challenging objectivity*, and *discrediting emotion* are tactics used by both opponents and proponents of fracking, in various ways, to discredit their adversaries.

Claim 3: Fracking is Harmful to Children’s Health

Along with women, children are recognized a vulnerable population when it comes to environmental hazards. This vulnerability is seen to start before birth, making

pregnant women primary targets of efforts to reduce exposure to environmental toxicants (Harrison, Partelow and Grason 2009). With regards to fracking in particular, some have expressed concern over air pollution as well as potential water contamination in areas associated with gas drilling, and how children might be affected by these impacts. In 2011, the American Academy of Pediatrics and the Pediatric Environmental Health Specialty Units Network released a joint statement on the potential hazards posed by hydraulic fracturing to children (American Academy of Pediatrics 2011). As in the case of breast cancer research, they argue that there has not been sufficient research to date to accurately assess the health impacts of hydraulic fracturing on children's health. Like Steingraber and others engaged in the debate over impacts on women's health, they argue that a precautionary approach to the practice should be taken until these impacts have been more thoroughly researched. Among the issues they highlight are potential contamination of water supplies near drilling activity, the use of toxic substances in the fracking and drilling process, and air pollution created at all stages of the extraction process. They make a series of recommendations about how these concerns might be addressed. Most broadly, they argue that health professionals should be advocates for children by insisting that human health impacts be part of the conversation regarding hydraulic fracturing.

Many anti-fracking activists have organized around the issue of the potential impacts of fracking on children's health. One notable example is Angela Monti Fox—mother of documentary filmmaker Josh Fox—who started an initiative called The

Mothers Project, or Mothers for Sustainable Energy. The website for The Mothers Project states:

This is a global coalition of mothers formed on behalf of children who cannot vote or make public policy. As their advocates and protectors, we support energy sources that do not fill our children's environment—and thus their bodies—with toxic pollutants. (Mothers for Sustainable Energy 2012)

While the organization is focused on sustainable energy and on environmental hazards more broadly, it was formed in response to the fracking boom taking place in the Marcellus Shale region. Their website goes on to state:

Our special concerns regarding hydraulic fracturing focus on the toxic chemicals and combustion by products into densely populated areas where millions of children live and where their food is grown. As such our special concerns address America's unbridled rush into the "new gas boom" that has spurred the proliferation of highly toxic sites across millions of backyards, schoolyards, neighborhoods, family farms, and recreational areas. (ibid)

Other anti-fracking activists have taken on a similar posture, drawing on their identities as mothers as a basis for their activism. This posture is not unique to the anti-fracking movement, but is widespread among grassroots activists fighting numerous environmental justice battles in their communities (Bell 2013).

Like challenges to the link between fracking and breast cancer, industry groups have challenged the science used by ESJ groups, arguing that it has been more guided by emotion and sensationalism than science. They have also countered with claims that anti-fracking activists pose a more palpable threat to children's health by blocking economic development and employment opportunities provided by the natural gas industry. Whereas ESJ groups argue that fracking can be linked with increased risk for

asthma and other health problems among children, industry groups argue that poverty caused by unemployment is a more likely culprit for these increased risks. Thus one Energy In Depth blog post cites a study from the U.S. Centers for Disease Control, stating: “This study found interesting data on children’s health in relation to household incomes, showing again a greater potential for adverse health from unemployment”(Krohn and Jacobs 2013). As I will discuss below, this strategy of *invoking the economy* is another key tactic used by EID and other industry advocates to counter the claims made by anti-fracking groups.

In addition to challenging scientific claims about the impacts of fracking on children’s health, some industry advocates have accused anti-fracking activists of “exploiting children” in the name of their cause. One “guest blogger” for EID named Betty Sutliff, for example, wrote an entry titled: “Message to Natural Gas Opposition: Stop Exploiting Children!” Sutliff, a retired schoolteacher and mother, argues that anti-fracking activists are exploiting children by scaring them with false information about the impacts of fracking and asking them to memorize this misinformation and repeat it in their classrooms. She gives an example of two New York elementary teachers who gave an assignment to fourth grade students to learn about and report on the potential impacts of fracking. Sutliff writes:

Apparently the teachers, who see themselves as having such a moral obligation to protect the environment from all the perceived ills of hydraulic fracturing, left their consciences somewhere in left field when it came to exploiting our most precious resource, children. Teachers, as authority figures, have tremendous power and influence over these young minds. Public schools are not an acceptable venue for indoctrination of any kind. (Sutliff 2013)

ESJ groups have responded to this criticism by pointing out that the natural gas industry has a long track record of indoctrination, exerting “tremendous power and influence over young minds” through the incorporation of pro-industry materials into school curricula. In response to Sutliff’s entry, Dory Hippauf wrote a piece for ShaleShockMedia.org, an anti-fracking website, pointing to such industry propaganda as Terry the fracosaurus—a character created by Talisman Energy to teach kids about the safety of drilling (Hippauf 2013).

A third avenue of attack for industry advocates has been the formation of groups of pro-fracking mothers who take their role as protectors seriously, and who do not believe that natural gas extraction poses a risk to their children or their communities. A recent rally in Albany, New York illustrates this point. In 2012, a group of women activists were holding a rally there to raise awareness about fracking. Members of the group, called the Women’s Energy Leadership Coalition, wore sashes that read “Silent No More!” and held signs about the impacts of natural gas on their communities. They gathered beside a marker celebrating women’s suffrage at the capital, and voiced their opinions about fracking as concerned mothers and grandmothers. This group included an environmental toxicologist and a farmer among its cast of concerned female characters. While we might expect such a group to be speaking out against fracking in their communities, this was actually a pro-fracking group, gathered in opposition to a proposed ban on hydraulic fracturing in New York (Colley and Jacobs 2012). The existence of such a group speaks not only to the centrality of gender in the debate over fracking, but also to the effectiveness of women’s anti-fracking activism. While having

an environmental scientist as a key spokesperson serves as a reminder of the importance of science in these debates, the group and its tactics also serve as a reminder that this is every bit as much a culture war as a science war.

These examples illustrate the centrality of strategies like *mobilizing mothers*, *questioning motives*, and *challenging objectivity* for both proponents and opponents of fracking. The Women's Energy Leadership Coalition also serves as a reminder that *appropriating activism* is a strategy that is starting to be used by pro-fracking groups (see Bell and Fitzgerald N.D. for an in-depth analysis of this strategy). In this culture war, there are many ways to occupy the moral high ground. While one could argue that Shelly DePue embodied the role of activist mother in *Truthland*, these women took it one step further by actually appropriating feminist symbols and activist slogans. Pro-fracking groups both discredit activism and emotion and simultaneously use those tactics when they are beneficial to their cause. Consider this description of the Women's Energy Leadership Coalition by EID blogger Rachael Bunzey:

The group spent the morning preparing for a march to the governor's office and the Women's Suffrage exhibit, an inspiring reminder of what women can accomplish when they work together for a common cause. They wanted anyone passing them to know what they stood for, so in the spirit of women's movements, made sashes to wear representing their hopes for New York's future with natural gas. (Bunzey 2012)

While it is unclear exactly what official connection WELC may have with Energy In Depth, the group's activities have clearly been coordinated with those of EID. As Bunzey noted in her blog entry, the group made sure Albany legislators all had a copy of *Truthland* in their possession:

The Women's Energy Leadership Coalition has grown substantially and they are now making sure their voices are heard. The group successfully distributed over 200 DVDs of Truthland to all the legislators in Albany and hopes to get a good response from them all! Keep your eyes open for the Women's Energy Leadership Coalition and get involved! Now is the time to step up and fight for our property rights!

The emergence of this strategy suggests that groups like Energy In Depth recognize the impact women's activism has had on the debate over fracking, and that they are willing to appropriate that strategy in an attempt to win over the hearts and minds of women. Interestingly, by invoking property rights, they are invoking the economy as itself an activist domain. This theme will be discussed in more detail below.

Claim 4: Fracking Harms Livestock

In addition to the environmental and health impacts mentioned above, fracking has been linked to sickness in livestock in some areas near drilling sites. Like health impacts on humans, health impacts of fracking on farm animals are difficult to assess. A peer-reviewed study suggesting a link between fracking and livestock health appeared in 2012; however, this study was based on interviews with livestock owners near drilling sites. The authors acknowledge the limits of the study, stating:

Complete evidence regarding health impacts of gas drilling cannot be obtained due to incomplete testing and disclosure of chemicals, and nondisclosure agreements. Without rigorous scientific studies, the gas drilling boom sweeping the world will remain an uncontrolled health experiment on an enormous scale. (Bamberger and Oswald, 2012)

Similar claims have been made by other researchers and anti-fracking activists who are concerned about the potential impacts of fracking on livestock—for the sake of the

health of the animals, the health of humans who may end up consuming them, and the livelihoods of the farmers who raise them. ESJ activists have argued that the shale boom, while economically profitable for some in the short term, endangers not only health and land, but family farms as well.

Industry advocates have responded to these claims in the same manner as they have responded to other claims about the impacts of fracking. Energy In Depth argues that anti-fracking activists are using scare tactics, and that there are no serious proven negative impacts of fracking on livestock health (Colley 2012). They cite critics of the above study who argue (as do the authors themselves) that it is inconclusive. These critiques, like the critiques of other studies regarding the impacts of fracking, have been widely circulated among industry supporters. Indeed, a central aim of groups like Energy In Depth is providing materials that can be used in response to the claims of the industry's critics. Consider the following quote from Conservative Outlooks—a website that targets a conservative audience—on the impacts of fracking on animals:

Michelle Bamberger, an Ithaca, New York, veterinarian, and Robert Oswald, a professor of molecular medicine at Cornell's College of Veterinary Medicine, published an article suggesting a link between hydraulic fracturing and illness in food animals. The piece is decidedly unscientific, providing neither data nor independent corroboration to support their assertions. Energy In Depth notes that Dr. Ian Rae, a professor at the University of Melbourne in Australia and Co-chair of the Chemicals Technical Options Committee for the United Nations Environment Programme, called the paper "an advocacy piece" that suffers from poor referencing, and the authors themselves "cannot be regarded as experts" in the field in which they are commenting. (Greenberg 2013)

In examples like this, not only does EID provide counter-experts, they act as a voice of authority. For many conservative groups, EID is the authoritative voice on these issues, just as Josh Fox acts as the voice of authority for many environmental and social justice

groups. This underscores the point that when it comes to evaluating the impacts of fracking, science is only part of the story. Shared values and political commitments obviously play a key role in persuading people about the impacts of fracking and which experts to trust on the issue.

Another way industry advocates have responded to claims about the impacts of fracking on farm animals is to focus on the economic benefits of the industry for struggling farmers in the region. At a time when the economy has been struggling, they argue that the natural gas industry has become a saving grace for many small farmers forced to make tough choices. Indeed, fracking is credited with saving family farms in these materials—not destroying them. And like other materials put out by industry advocates, these materials are often targeted toward women. A promotional video produced by Energy In Depth exemplifies this strategy. The short video, titled “Women of the Marcellus,” tells the story of several family dairy farms that have been saved by the opportunities provided by the natural gas industry (Energy in Depth 2012a). The video highlights women talking about their farms, their families, and their gratitude to the natural gas industry for helping them stay on their land and keep their families together in tough times. One woman is a dairy farmer who credits the natural gas industry for saving her farm and keeping her family together. Another is a single mother who is able to move back to the area thanks to money earned by leasing her land. A third is an entrepreneur who was able to start a bed and breakfast catering to people in the industry. In all of these stories, the natural gas industry is seen as a force that provides jobs and economic security in financially difficult times, while helping keep

families together. Claims about livestock contamination are not mentioned in the video. It is not intended to debunk claims, but simply to provide a positive image of the industry and its impacts on family farms. *Women of the Marcellus* may be seen as an example of mobilizing mothers, but it is primarily about invoking the economy.

Like the claims about breast cancer, children's health, and water quality, claims about fracking's impacts on animals cannot be definitively proven or disproven. In all of these cases, the scientific studies that exist are tenuous, and there is little funding for the kind of large-scale studies that would be required to make more robust claims about those impacts. In the debate over the environmental and health impacts of fracking, science remains a central part of the equation—but in the struggle for public opinion, it is only part of the story. As these examples remind us, even when truth claims are mobilized and contested in the process, these debates are as much about storytelling as they are about science. And as they also illustrate, the stories told on both sides of the issue are not only politically charged, but also highly gendered.

CONCLUSION: Science Wars as Culture Wars

Throughout this thesis I have argued that the truth about fracking is as much a matter of storytelling as it is a matter of science. I have also identified some of the strategies used by both industry advocates and environmental justice groups to make their claims. These include *mobilizing mothers*, *challenging motives*, *questioning objectivity*, *appropriating activism*, and *invoking the economy*. As I have attempted to illustrate, these strategies have been used in highly gendered ways by both opponents

and proponents of fracking. In order to understand the impacts of fracking, we have to critically examine the stories we tell ourselves and each other about those impacts. Along with scientific facts, both pro-fracking and anti-fracking groups mobilize cultural symbols and identities—motherhood, environmentalism, family farming, family values, individualism, and patriotism among them—in order to persuade the public that their views on fracking can be trusted. These symbols and stories cannot be separated from the scientific data about the impacts of fracking. Both require interpretation and judgment, and both are informed by cultural beliefs and values. In Haraway’s words: “Scientific practice is above all a story-telling practice” (Haraway 1989, 4).

Based on the materials examined here, two competing narratives about fracking and gender can be identified. The first story, popular among ESJ groups, is that fracking is poisoning our water supply, threatening our health (particularly the health of women and children, who are more vulnerable to its impacts), sickening our livestock, and possibly even contaminating our food supply. According to this narrative, energy companies and other special interests are obscuring the truth about fracking, and must be brought to task. Furthermore, women have a special interest as mothers and as protectors of their families and the planet to stop this practice until more research can be done to assess its safety. The second story, popular among industry advocates (and developed largely in response to the first story), is that fracking is a safe, affordable, and reliable way to produce energy that is cleaner than coal, and that fears about environmental and health impacts are unwarranted and based on bad science. According to this story, women and children are more vulnerable to negative health

effects from poverty and unemployment than they are from fracking, and anti-fracking activists are exploiting women and children by suggesting that their health is endangered by gas drilling. Furthermore, women have a special responsibility for protecting children from misinformation about fracking and from the negative impacts of unemployment that results from anti-fracking activities. In this version of the story, fracking actually protects children, saves family farms, and puts food on the table for families.

These competing narratives demonstrate that the debate over the environmental and health impacts of fracking is as much a culture war as a science war. And as illustrated throughout this paper, that battle it is largely a battle for the hearts and minds of women. Gender is an important component in the analysis of fracking, and of environmental and health impacts of polluting industries more generally. As such, gender deserves more scholarly attention within environmental sociology than it is currently receiving. To return to the discussion at the outset of this thesis, I contend that gender—far from being a peripheral or optional topic—is actually integral to our understandings of nature, environment, and human health. Gender shapes the process through which scientific facts and findings are constructed, as well as the ways those facts and findings are disseminated and mobilized by a wide range of players engaged in debates about environmental and health impacts of polluting industries. I contend that engagement with the cultural and ideological dimensions of those debates—including their gendered dimensions—is as important as engagement with its scientific and technical dimensions. For environmental sociologists, feminist work in sociology and

related fields can be a rich resource for addressing these aspects simultaneously. More specifically, feminist scholarship in science studies, environmental justice, and Appalachian studies literatures provides a particularly strong foundation for this kind of interdisciplinary work.

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Professional Positions Held

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Scholastic and Professional Honors

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