January 2013

Rural Communities: How Do Individuals Perceive Change When Industry Enters the Area?

Katherine Danielle Ferrari
University of South Florida, k.d.ferrari@gmail.com

Rural Communities: How Do Individuals Perceive Change When Industry Enters the Area?

by

Katherine D. Ferrari

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
School of Social Work
College of Behavioral & Community Sciences
University of South Florida

Major Professor: Sondra J. Fogel, Ph.D.
Robin Ersing, Ph.D.
Michael J. Lynch, Ph.D.
Wilson R. Palacios, Ph.D.
Nan S. Park, Ph.D.

Date of Approval:
10/15/2013

Keywords: Community Development, Fracking, Environment, Macro Practice, Phenomenological

DEDICATION

This work is dedicated to the Laurel Highlands and beautiful landscapes and wildlife within. I hope that the gifts the area houses are here for many generations to come. I am forever grateful to my dad, Bob, for choosing to live in the Laurel Highlands, and whose love of the mountains provided me with the opportunity of growing up in a place which offers so much. To my Mum, Theresa, thank you for always demonstrating resilience and pushing me in that special way only someone who taught phys ed. for over 35 years can!

To those people in my life who moved on while I was working on this project: My kindred spirits Jimmy, Grace, Audra, and Nana- I am no longer a solitary walker when I hike through the mountains! -As well as my grandmother, and my most motivating teacher Mr. Schmeltz, who taught me critical thinking at a critical time- thank you for showing me I was capable of this.

To the kindred spirit I gained during this work – Krein. There are so many things to thank you for but I will leave it at listening to me vent, being 24/7 on-call IT support, and putting up with me through my research, writing, and wall building.

To Jim Sterner, for giving me a mantra to use when I was about to give up: "Endeavor to persevere," (*The Outlaw Josey Wales,* 1976).

ACKNOWLEDGMENTS

I would like to thank my dissertation committee who helped me throughout this process which includes Dr. Sondra J. Fogel, Dr. Robin Ersing, Dr. Michael J. Lynch, and Dr. Nan S. Park. Thank you for sticking with me through my work in an area that some may think of as outside the box of “typical” social work.

Dr. Fogel, as my major professor you guided me through every step of this process, from development to conclusion. Your direction and encouragement helped me tackle a topic as immense and difficult as this.

Dr. Ersing, thank you for sharing your ideas and helping give shape and direction to this work. I am grateful to have someone with your dedication and professionalism on my committee.

Dr. Lynch, it was amazing to have someone with your background providing feedback on this topic. I hope that social work is one day as active in environmental justice as criminology currently is. Thank you for your research in vitally important environmental issues.

Dr. Park, your command of qualitative research helped guide the methods that were employed. Your expertise in this area was vital to this work. Thank you for your time and comments.

Dr. Palacios, thank you for serving as the outside chair of my defense, sharpening my computer skills, and suggesting qualitative resources that played a critical role in my data analysis.

I hope my paths cross with each of you during future pursuits!

And finally, I would like to thank the residents of the Laurel Highlands who invited me into their lives to share their experiences regarding their changing community. Without you this would not have been possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

As the landscape of the United States changes and world resources face depletion, shale gas development has become a major social justice issue. Social workers may be called upon to help support communities undergoing change from industry as well as the environmental and social justice concerns that are arising in areas with rich natural resource supplies.

This research examines how a rural population perceives change when industry enters an area. It explores community change and social justice concerns that are occurring with shale gas development in order to help determine implications for social work practice.

Using a phenomenological approach, this work examined the perceptions of 20 residents of the Pennsylvania community of the Laurel Highlands who live within 10 miles of where fracking has occurred. In depth interviews were carried out with this population to explore their perceptions of community change from shale gas development.

Residents of the Laurel Highlands report anxiety about the future of their environment, including negative impacts to the air and water. They are angry about the outsourcing of local natural resources to other areas in both the United States and abroad.

Residents feel a loss of power and sense of control due to shale gas development and the large corporations which support its growth. These factors are negatively impacting their quality of life. Shale gas development and the changes it brings are influencing residents' decisions about investing in the Laurel Highlands as well as staying in the area long term. As a result of these factors, community action is increasing to help build support during industrial development in the area. This work examines these themes and concludes with a discussion of how social work practice can help assist rural residents with their changing communities.

CHAPTER 1:

INTRODUCTION

Background

In the United States, citizens expect that every day their lights will turn on, that their heat or air conditioning will run, that fuel will be available for their car….(etc.) Energy supplies that make these things happen come from a variety of sources, including petroleum and its byproducts, as well as coal and natural gas. These natural resources are found in areas across the globe. In the eastern United States, timber and coal have been extracted for over a century and continue to be harvested from the Appalachians, a region of mountains stretching from Georgia into northeastern Canada. Presently, large supplies of natural gas have been added to the list of valuable fuels buried within the mountains of Appalachia and the development of this resource is impacting the communities it is buried deep within.

The Appalachian Region, while known for its beautiful fall colors and scenic tourist towns, is also filled with many rural communities that have valuable natural resources. Because of these resources, many residents of rural areas are developing contracts with corporations and leasing their gas and mineral rights so that companies can

extract and export natural resources. Shale gas development and the method used to obtain the gas within the shale, hydraulic fracturing, are changing communities.

Research regarding community change promoted by industrial influences relating to natural resource extraction has been done in the past; the focus of which has included industries such as timbering and coal mining (Conrad, 2008; Hendryx, 2008; Hendryx & Ahern, 2008; Milici, 2000). Prior research in this area suggests that there are both positive and negative consequences for individuals and rural communities when extractive industries come into the area (Earle, 1997; Hendryx, Ahern & Nurkiewicz, 2007).

Currently, improvements in a process called *fracking,* have enabled the extraction of natural gas from deep shale formations scatted across the United States to occur on a large scale. While debates on the merits of natural resources extraction continue, innovation in this area progresses. However, this quickly growing shale gas development industry may be presenting an emerging environmental justice concern for rural communities and residents (Witter et al, 2008).

There is scant research within the social work literature regarding individual and community change promoted by the influx of industry in rural communities, even though *environmental justice* has been a concern of the profession since the end of the 20th century (Rogge, 2008). Environmental justice "embodies social work's person-in-environment perspective, dedication to people who are vulnerable, oppressed and poor, and is embedded in sustainability development" (Rogge, p. 136-137). Traditional clinical

roles within the field of social work are well suited to address environmental injustices as are the more macro practice oriented skills such as policy and legislative advocacy, building coalitions, and administering responsible agency practices. The intent of this research is to gain insight as to how rural communities are changing due to shale gas development, and determine the needs of residents to help inform social work practice.

Current Issues

Shale gas deposits are among the rich supplies buried within the Appalachian Mountains and are located deep underground in the *Marcellus Shale* formation. It has been estimated that the Marcellus Shale formation may contain over 500 trillion cubic feet of natural gas (Englander & Lash, 2008). Some geologists speculate that there may be an even greater supply of natural gas in reserve. Marcellus Shale is found over a mile beneath the surface of land stretching through parts of the Appalachians in New York, Pennsylvania, Ohio, West Virginia, and small sections of Virginia and Maryland which can been seen in *Figure 1.1*.

Shale gas found this deep in the earth once posed extraction problems, as accessing it was expensive, time consuming and the return was not sufficient to meet the high costs. However, over the past decade new technology has allowed for more efficient extraction of the supplies. Companies possessing the technology and equipment to carry out the deep gas drilling process have been spreading throughout the areas within the Marcellus Shale formation where gas deposits can be found, many of which are rural. It is a quickly growing industry causing many changes in the communities in which it is

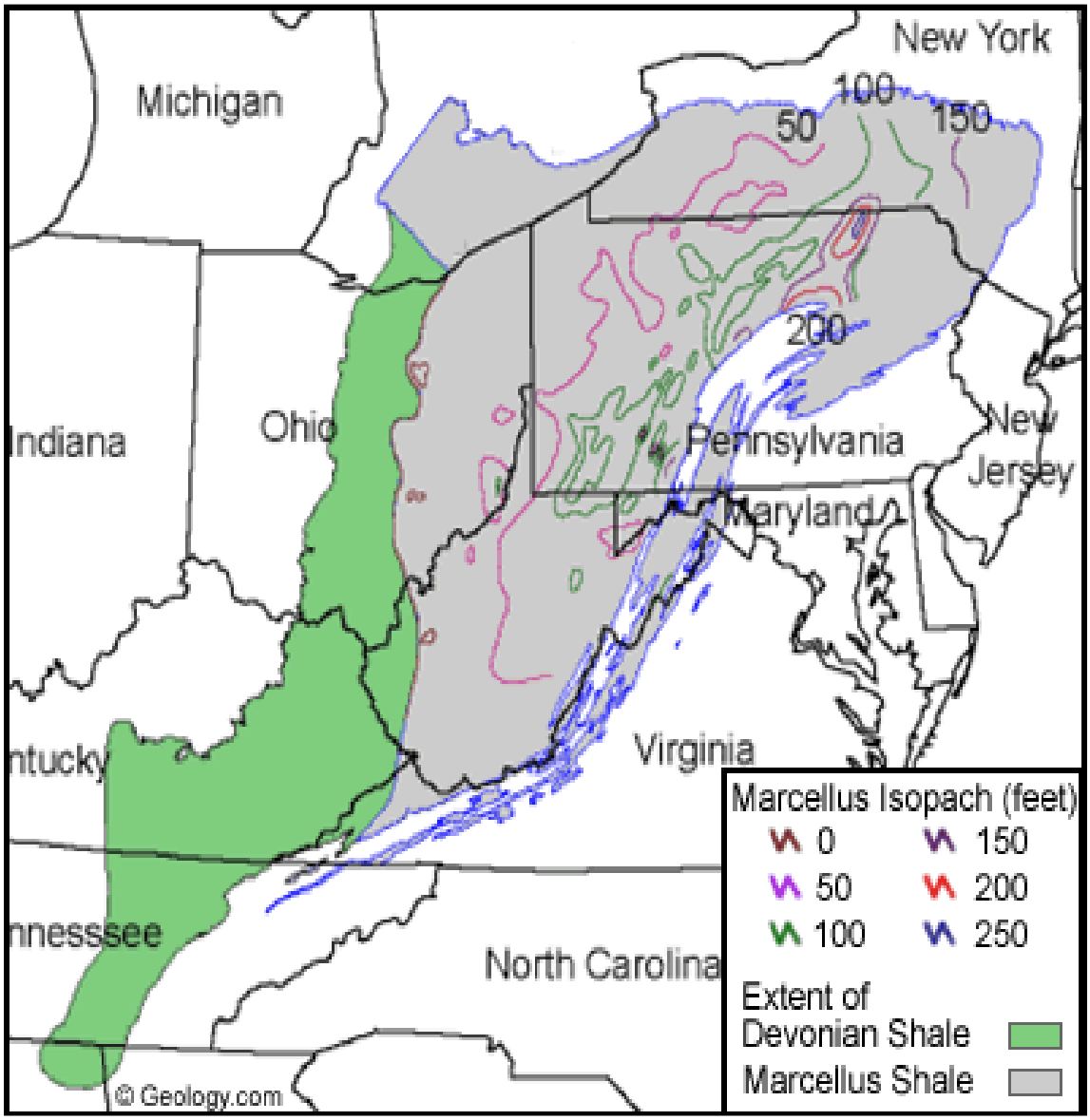

Figure 1.1. Map of Marcellus Shale Formation

Source: Geology.com (2013).

being conducted. The technology used by this industry is also introducing many questions about the process of extraction and the after effects of shale gas development on rural areas and residents.

The process of extracting natural gas from Marcellus Shale is a complex and expensive procedure. In the past, gas could escape from natural fractures in the rocks and more embedded gas was difficult to reach. Advances in drilling techniques have allowed machines to make inorganic fractures in the shale formations through a process called *hydraulic fracturing*, or *fracking*. The gas is reached through *hydraulic fracturing* of the shale deep beneath the earth's surface. These fractures are made by forcing sand propelled by millions of gallons of water mixed with chemicals, known as *mud*, into the shale and creating spaces for the gas to escape. Vertical wells are drilled to reach the shale. Following this, horizontal drilling is done essentially linking the vertical wells (Marcellus Shale Coalition, 2013).

This type of drilling requires countless natural and monetary resources. It has been estimated that horizontal wells requiring multiple fracturing may require between five and six million gallons of water (D.B. Burnette Global Petroleum Research Institute & C.J. Varva Separation Sciences Guru Food Protein Research Center, 2006). This type of horizontal drilling may cost four million dollars or more in order for a single horizontal well to be drilled.

To illustrate some of the immediate effects shale gas development has on people and the environment, a brief overview of the process will be described. As with any

natural resource extraction, corporations specializing in shale gas extraction begin the process by recruitment and exploration. Companies determine which areas are likely to have shale gas reserves by engaging in seismic testing, where small explosive charges are used in conjunction with sensing devices to determine the amount of gas contained over a mile beneath the surface of the landscape. This determines the best places to drill for shale gas in an area.

Beginning by identifying landowners with the most prospective gas reserves and largest acreage, a representative from one or more companies contacts the mineral rights owner, which depending on the state one resides and the deed one possesses, may or may not be the owner of the surface rights. The representative finds out if he or she is interested in leasing their gas rights to the company. The person who does this is known in the industry as a *land man*. The land man may engage respective clients through phone calls or by going door to door. This person talks to the owners about the project and offers incentives to lease the land. These incentives may come in the form of money for acreage and a percentage of the profits made if gas is found. Companies work their way down the line to owners of smaller land plots to fill in the gaps between large reserves. A basic contract provided by the gas company is presented to the landowner in the hopes that this will be the signed agreement. However, residents may choose to hire a lawyer to review and amend the contract with the resident's requirements listed.

Once the contract is established the drilling may begin. Initially, an access road is made from the main road to the drilling site. Then a minimum of five acres must be clear

cut and made into a completely level pad. A man made pond may be dug to hold the water needed for the fracking, as well as *flowback*, which is the liquid that comes back to the surface after the well is fractured (Halliburton.com, 2013). After this, drilling may begin.

Drilling is done 24 hours a day seven days a week and requires a large amount of equipment, including a drill rig, which may range in size depending on the site from the size of a large tractor trailer to a 2000 square foot house, as well as trailer support vehicles carrying supplies to the site. These supplies are brought to the site 24 hours a day. After drilling more than a mile through the earth, the fracking can occur.

In order to frack a well, cement casings are placed in the well, followed by the detonation of explosives, causing fractures in the rocks. *Mud*, which is sand combined with a mixture that may contain over 100 different chemical compounds and water, is then continuously pumped into the fractures in order to expand them to the necessary size. When this is completed, the well is contained and workers are brought in to the site to install well pumps and meters. The area is then reclaimed with grasses and other vegetation native to the area. *Appendix B* is a link to a video which describes the process of fracturing a shale gas well (smrtlearningchannel, 2011).

Because drilling in the Marcellus Shale formation is a relatively new process in many of the towns where it is occurring, it is unclear what the effects of shale gas development will be on residents of these communities. There are various impacts that may occur. These include changes from an influx of employees and their families

employed by natural gas companies. Community transformations may follow this, including demographic effects on area schools, community income, and housing. Local business may boom. Communities may have greater employment opportunities from drilling jobs and site development, such as excavating and reclamation of the areas. There may be more opportunities for income for residents and in turn economic stimulation from workers spending money in the community.

Social Justice

Despite the positive economic stimulus shale gas development may offer, the natural gas extraction process may be presenting emerging social justice concerns for residents. Through an in depth examination of resident perception of community change, this research explores how rural populations are identifying social justice concerns because of shale gas development. The results from this research help determine implications for social work practice in rural areas. This work also suggests how social workers can assist rural populations to meet challenges that arise from changes in their communities.

The NASW Code of Ethics lists social justice as one of six ethical principles and urges social workers to "challenge injustice," (NASW, 2008). Shale gas development and fracking are presenting environmental justice issues, which are a sub-category of social injustices. These issues stem from the economic needs many rural residents have and ongoing pressure from natural gas companies to lease their land and drill, despite not knowing long term impacts on health and wellbeing. Residents may lack the resources to

move and if they are in the way of a pipeline or on an area with great reserves of natural gas. Land owners may not own their mineral rights and have no say as to whether or not the fracking can occur. Pressure from neighbors and gas companies may force those who do own their mineral rights to lease their land. Economically challenged residents may lack the resources needed to pay for lawyers and to challenge corporations if there is damage to their homes or health.

Prior research has found that disadvantaged communities and vulnerable populations, including impoverished and children, have an increase health risks, while also suffering greater environmental concerns than wealthier areas due to industrial influences (Hoff & Rogge, 1996). Higher income residents may not be aware of possible negative impacts to the land, water, or air. Home and land owners not owning their mineral rights may be forced to have drilling occur on their land if the owner does sell the right to the land. Residents who do not lease their land may still be affected due to proximity to the drilling site or a pipeline.

A key concept in community social work is *capacity-building*. Payne (2005) defines this as "seek[ing] to build understanding and skills to enable excluded individuals, groups and communities to participate more effectively in their communities," (p. 209). This work is a step in understanding the needs of residents in a changing community. Once there is a better understanding of what those needs are, social workers can look to identify and build needed skills to help rural residents become active participants in their communities as growth and change occur.

Methodology

This work is a qualitative examination of how individuals perceive change from shale gas development in their community. It explores a region known as the Laurel Highlands, located in southwestern Pennsylvania; examining the area as a whole, as well as individual components that form the sub communities within the Laurel Highlands.

The primary component of this research consists of interviews with a sample of 20 people who live in the Laurel Highlands and reside within a 10 mile radius of where fracking has or is occurring. This sample was chosen as they are very much affected by the effects of gas development in the Marcellus Shale, and are first hand witnesses to changes occurring within their community.

The focus of this work is to explore what is occurring in an area experiencing shale gas development. By employing qualitative research methods, the information gathered helps to provide a picture of how individuals in a rural area perceive changes occurring in their community due to shale gas development. From the work that was completed, social workers will be better informed to support and intervene in both direct and macro ways to assist the community, as they have more information about the needs of the clients they serve.

Conclusion

Residents in rural areas where shale gas development is taking place are firsthand witnessed to changes in their communities on a regular basis. Advances occurring with shale gas development and the processes associated with it are making it a more common

occurrence across the area. During the past few years, small towns have been bombarded with media reports on issues regarding shale gas development. Reports are varied and range from topics such as "*Gas Boom Aids Pennsylvania, But Some Worry Over the Risk*," (Seelye, 2011) to "*Gas Well Fire Extinguished in Mercer County*," (Balingit, 2012). Headlines such as these pop up on news sources several times a week. Seeing this on a regular basis, combined with knowing the community and available support channels (or lack thereof), it appears that shale gas development is introducing new concerns and issues for residents of the Laurel Highlands, who may have limited supports and resources to help them address needs.

As shale gas development spreads across the Laurel Highlands and other communities throughout the nation, the process and industry which supports and develops it, is presenting environmental and social justice concerns to rural families and their communities. Through an exploration of how individuals perceive changes that are occurring in their community, this work helps to inform the relationships between families, corporations, and the land.

The phenomena explored throughout the course of this research helped to gain insight into an area in transition. The information that was gathered may not only be used to inform and enhance the work conducted by those in the social work field, but more importantly, to help inform and support the communities and residents undergoing change from outside industrial influences.

Summary

This chapter provided an overview of the area of research. The following chapter provides background information about the issues and more detailed information about what is occurring in other areas experiencing change from industry. Subsequent chapters discuss the research methodology, research findings, and a discussion with recommendations for social work practice.

CHAPTER 2:

LITERATURE REVIEW

The purpose of Chapter Two is to provide information about Appalachia, rural communities, and demonstrate some of the effects that shale gas development has had on individuals and communities outside of the Laurel Highlands.

Background

Rural communities are areas outside of urban and metropolitan centers containing low population densities. The United States Census Bureau defines a rural area as an area of open country or a town with a population of 2500 or less (U.S. Census Bureau, 2002). The Appalachian region consists of 24.8 million people residing within 205,000 square miles of terrain on and surrounding the Appalachian Mountains. It encompasses 420 counties and parts of 12 states including New York, Pennsylvania, Ohio, Maryland, Virginia, North Carolina, South Carolina, Tennessee, Kentucky, Georgia, Mississippi, Alabama, and all of West Virginia.

The national percentage of rural areas is 20%; in Appalachia, that number is more than doubled at 42% (Appalachian Regional Commission, 2010). These areas are quite different in many ways from their metropolitan counterparts. The culture, history, education, economy, health, lifestyle, and industry of rural residents differ greatly. Rural

areas also face challenges and issues that may be quite different from larger towns and urban centers.

Perception of Community

This research explores individual perceptions of a community as it is influenced and changed by industry development. A theory for understanding one's *sense of community* comes from the work of McMillan and Chavis (1986). They propose four components that make up how members perceive their community. These include: 1) *membership*- how one feels he/she is secure and belong within the community; 2) *influence*- a community member's feeling that he/she has some influence on the community as well as the community having an influence on them; 3) *integration and fulfillment of needs*- residents of a community feel positive support from the community and share values with other members; and finally, 4) shared emotional connection with other members of the community (McMillan & Chavis, 1986).

Components of sense of community present themselves when looking at how rural residents perceive the community as shale gas development occurs in their towns and lives. Research conducted on rural communities has shown that close ties to one's community lead to high levels of using coping skills to focus on negative community issue impacts (Bachrach & Zautra, 1985). Due to a lack of organized resources present in many urban settings, residents of rural communities have developed naturalistic systems in order to support their needs (Waltman, 2011).

In order to make economic gains or survive financially, many residents of rural areas have developed contracts with gas and oil corporations and have leased their property so that these companies can extract and export natural resources. Even families who may not want to have their property or natural resources taken from them are facing pressure from big oil and gas companies to lease gas, oil, and mineral rights. This is especially true if the land he or she owns is part of a larger gas reserve or in the way of a pipeline. Sense of community may affect decisions residents make regarding the natural gas industry, and also how they perceive change in the community occurring as a result of industrialization.

Cultural Issues

Culturally speaking, residents of rural areas may hold significantly different values and ideas than residents that of those residing in urban areas. There is a greater distance between homes in rural areas, but residents are more familiar with their neighbors and community members than their urban counterparts may be. With a smaller population, there exists a greater chance of face to face contact of people you know and engage with socially. Residents of rural areas have fewer options for shopping and other daily activities, so they are more likely to see friends or relatives while out in the community than if they lived in an urban or suburban center with more options.

Rural residents may be wary of “outsiders” and cautious to interact with them. Residents may have deep ties to the land and water and remain in the area for the environment. Hunting and fishing are common activities and help to seal this connection

between residents and the natural environment. There is cohesiveness between residents and their communities as well as deep bonds between families and their communities (Dillon & Henry, 2008).

Geography

Geography and climate affects Appalachian residents. The mountainous terrain may be difficult to traverse all seasons, but especially during harsh and snowy northern winters. Accessing stores for supplies and necessities, health care facilities, and schools may be problematic for residents. Residents may be extremely separated from each other and not able to reach out for help or assistance. Rural residents may have to travel long commutes to get to work, which is a great economic expense. There are limited public transportation options for people, so those without vehicles may be home-bound until they can find assistance to travel.

In many rural areas, there are fewer mass communication options and media sources, such as the internet and cable television. Therefore access to quick and current information may be difficult to obtain for rural residents. This can be a huge hindrance, as it limits communication with people outside of the area and reduces access to important media and news content. People may rely on what they are told by neighbors or community resources, such as the church and schools, regardless of the reliability of what is being presented.

Industry and Education

The economy and industry of rural Appalachia is specific to the area. It has long been tied to the land and natural resources of the region. There are common educational differences between rural and urban areas, such as fewer higher educational opportunities for residents, and many rural residents who do receive formal training may leave the area in search of more skilled and higher paying jobs (Goetz & Rupasingha, 2004). This may greatly affect the economy and industry of rural Appalachian communities.

As mentioned earlier, the land and natural resources are a part of rural resident's day to day life. Appalachian residents are dependent on the land and natural resources. Farming can be important to homes, as many residents have small farms to provide food to their families, and possibly provide a small income by supplying food to other community members. Many people hunt and fish for both recreation and sustenance. Tourism in Appalachia is supported by natural resources, with people visiting from across the globe to vacation in the area. Tourism dollars come from the use of rivers, where rafting and kayaking are available, as well as the mountains which offer year round recreational activities, including skiing, hiking, mountain biking, and camping. Scenic byways and small roads "off the beaten path" offer travel alternatives for tourists traveling through Appalachian states.

Natural Resources

Appalachia has long been an area with a great supply of natural resources that have been used for fuel. For decades, the most important have been coal and timber. Not only have

residents depended on these fuels to heat their homes, but they have been outsourced to larger communities. Coal provides fuel to fire power plants for communities in Appalachia as well as other areas.

Within Appalachia, the areas of western Pennsylvania and Maryland, West Virginia, southeast Ohio, southwest Virginal and eastern Kentucky contain large amount of bituminous coal. These areas have been mined for their resources which in turn supply economic benefits to the areas and jobs for Appalachian workers. There are several types of mining methods including strip, underground long wall, and mountain top removal, which is a process where the top of a mountain is blasted away to access the coal underneath. Gas drilling and exploration has been occurring in Appalachia, again providing fuel for residents in communities and outside areas, as well as jobs and industry for communities.

Mining and timbering are a source of industry and income for rural communities and residents. A decline in small farms throughout the Unites States means a loss of a way of life for many people. Families owning small farms for hundreds of years may no longer be able to afford to keep up with the expense of production for sustenance, let alone having the crops produce a steady and sufficient source of income. Combined with lack of higher education options (Goetz & Rupasingha, 2004), working in the timber, coal or natural gas industry may be one of very few options for the last of many generations of farmers.

Farmers, as well as other landowners in Appalachia, may feel a need to lease their land to oil or gas companies to supplement their income. Corporations offer incentive pay to residents for their mineral rights. Many questions arise once this occurs. What are the effects of the process of natural resource extraction and production in rural Appalachian areas? How are residents and communities affected while the operations are in place as well as after the supply has been diminished or depleted? What are the social, economic, and physical impacts of these practices on residents? These are all valid questions that need to be addressed but are often overlooked by rural residents, many of whom may be in great need of extra income and energy supplies that could be provided by leasing their land to coal or gas companies.

Case Examples

In order to illustrate possible outcomes from natural gas extraction on communities, consequences of other natural resource extraction practices will be used as examples. These methods will demonstrate the current economic, social, and physical effects on individuals who reside in rural Appalachian communities where resources have been depleted. Communities and residents may experience immediate economic benefits when extractive industries infiltrate an area. However, the processes may also have negative effects while occurring, as well as devastating consequences to areas once the jobs are completed and the industries have left the vicinity.

The process of mining itself is one of the most dangerous endeavors one can undertake while working. International headlines in April 2010 reported a mining

explosion in China which killed five miners. Only a few days later, 29 coal miners lost their lives in a West Virginia coal mine, making this the deadliest accident since a 1970 explosion killed 38 miners in Kentucky (Bluestein & Smith, 2010). This mining company had been cited four times for offenses including improper ventilating and allowing accumulation of combustible methane; with fines of $382,000 in one year (Graham, 2010). Deep coal miners go into work daily knowing that their job poses serious short term risks such as these accidents.

Along with immediate risks to health and safety, there are other concerns that occur from the mining industry. Homes in the vicinity of surface mines sites can be damaged due to mine blasting incurring structural damages that can include, but are not limited to cracks in foundations, seals in double pane windows going bad, cracks in concrete structures including driveways, and ruptures in retaining walls (K. Kasserman, personal communication, March 8, 2011). In some areas where mining has occurred, gas migrates into water wells. This may occur when the coal barrier keeping the gas in the ground has been disturbed to the point that the gas escapes into the underground water supply (K. Kasserman, personal communication, March 8, 2011). Roads may be damaged due to truck traffic bringing supplies into the area and exporting the resources out. Roads in rural areas may be small and not structurally engineered to hold the high volumes and heavy pieces of equipment which are necessary throughout the process of coal production and distribution.

Research indicates that there are many subsequent effects on individuals and towns after coal mining has occurred. The influence of mining can be felt in physical and environmental health, education and the economy. Research shows that certain areas with a high level of coal production have an increased association with diseases such as hypertension, cardiopulmonary disease, lung, and kidney disease, as well as a higher mortality rate for men and women with chronic diseases of the heart, respiratory system, or kidneys (Hendryx, 2008). Mine drainage may seep into the water supply and cause changes. Soil erosion and landscape change may result from mine subsidence and failure to properly return the mining site to a safe condition. These environmental changes may in turn cause farms to suffer, as crops may fail due to poor conditions and water quality. Poor water quality affects how families are fed and income that may have been generated from the production of crops.

There are economic aftereffects when coal reserves have been mined. What has occurred in many mining towns can be described by the boom town model. Presented by Ginsberg (1993) and defined by Davenport and Davenport (1981) a boom town may be defined as:

1. a community experiencing above average economic and population growth,
2. which results in benefits for the community (e.g., expanded tax base, increased employment opportunities, social and cultural diversity),

3. but which also places or results in strain on existing community and social institutions (e.g., familial, educational, political, economic) (p. 144).

There can be immediate economic benefits to communities and residents when the mining industry enters an area. However, there are also negative effects that occur from the industry, as well as devastating consequences to communities once the jobs are no longer needed because the industry has left the community

Impacts occur to local economies after the coal reserves have been depleted and jobs are cut. Research shows an increase in high school dropout rates in these areas during a coal boom (Black, McKinnish & Sanders, 2005). Once the mining jobs are cut or coal production has been reduced, workers without high school diplomas may find it difficult to find another job to support themselves and their families. When enough families' suffer from lack of work, the community does in turn, as there is less money to be spent to strengthen the economy. Like western town after the gold rush, many Appalachian rural communities resemble ghost towns, with rundown main streets, closed stores, and empty homes, due primarily to the migration of the workforce to an area more suitable for employment.

Shale Gas

Some are describing Marcellus Shale extraction as the “new gold rush” (Marcellus Shale Coalition, 2010). But what are the benefits and consequences of this gas rush? This research explores how individuals perceive the effects shale gas development are having on an Appalachian community as it occurs within Pennsylvania’s Marcellus

Shale formation. This qualitative work explores the gains and problems that are occurring, as well as the socioeconomic effects on the community and residents.

At this time, only limited research exists concerning the social effects of shale gas development. This research adds qualitative information as to how shale gas development and fracking are affecting rural communities through examination of individual perception of change.

Regulation gaps. Shale gas development currently exceeds the capacity of regulatory bodies, both state and federal, to establish controls and implement regulations. For instance, the *Pennsylvania Department of Environmental Protection* (DEP), set standards that make it mandatory for mining companies to test the water supplies within 1000 feet of mining operation sites. When drilling for shale gas, the same water testing is not required by the state and is voluntary. Surface mining is required to do a pre-blast survey of homes within 2500 feet of the blasting area known as a "presumption zone" (K. Kasserman, personal communication, March 8, 2011). The same is not true of deep mining or gas well drilling, and even this 2500 foot presumption zone of areas which may have structural damage due to blasting may not encompass all houses that could be affected. Underground mining companies may do an initial home inspection, but this depends on the distance from the site and the angle of influence, which is the area engineers determine mine subsidence may take place. Not all residents possess the knowledge that damage may result due to mining or drilling, and therefore will not have a home inspection completed. During the drilling process, there is the possibility of frack

fluid spills and blow off from the sand used in the fracking process. Since drill sites can be as close as 200 feet to homes, schools, business districts, play areas and other establishments, the chemicals contained in these materials may reach residents.

Water concerns. Key issues with shale gas development arise from the water that is used for the fracking. This process can take up to six million gallons of water. In some areas, the water that is utilized comes from water supplies located in close proximity to the drilling site. Removing this much water may tax small streams and creeks that are necessary for residents, animals and local vegetation to survive.

As stated earlier, the water and sand used to fracture the wells is mixed with various chemicals. Some of the chemicals used are known carcinogens. Chemicals include, but are not limited to, benzene, ammonium chloride, and hydrochloric acid (Environmental Protection Agency, 2002). The exact amount and type of chemicals vary according to which company is doing the drilling, and these companies are not required to make public the amount of each ingredient in their mixture. This gap in regulation falls under the *Halliburton Loophole* which exempts oil and gas companies from many health and safety regulations of the *Clean Water Act.* This Act, which calls for protection of drinking water and requires that surface water be able to support wildlife and fish, was already found to be violated in 75% of facilities granted permits in Pennsylvania between 2002 and 2005 (Burns, Lynch, & Stretesky, 2008).

Water issues can occur after fracking is completed. This is the dilemma of where the waste water, also known as *flowback* or *brine*, from Marcellus Shale drilling sites

goes when drilling is completed. Flowback is a combination of fracking fluid, underground water, and other materials that combine underground when fracking is being done and rise up to the surface (Marcellus-Shale.us, 2013). This water can easily make its way untreated into local water supplies, either intentionally or unintentionally, causing damage to drinking water.

One place to treat the water is at a brine treatment plant. State and federal regulations do not required that companies use these sites for treatment, and with an increase in number of drill sites, the capacity to treat all of the waste water may not be there. One option is to reuse the water for more drilling, but this is done at the discretion of the company. Brine may also be transported to areas that are disposing of it by injecting it back underground in wastewater pits, which is causing problems in areas where this is occurring (Chol, 2013).

Stretesky and Lynch (1999) state that corporate environmental violence "occurs when corporations dispose of their 'waste' products in unsafe ways" (p. 168). Communities located in the vicinity of where this research occurred have reported dangerous disposal of waste products produced from shale gas development and fracking. There have been documented instances of companies not reporting leaks in wastewater disposal wells and of illegal dumping of wastewater (Hopey, 2012). This includes one company dumping waste water into streams in six counties over a six year period (Ove, 2012). The occurrence of incidents like this suggests that corporate environmental

violence is an issue that communities undergoing shale gas development and fracking have to deal with.

More problems may occur in water supplies due to drilling. These include contamination of water wells from the chemicals used in the fracking process. The fracking chemicals may seep into underground water supplies, or end up in streams, creeks and rivers located in proximity to drilling sites. This may occur if there is a problem with the well's casing- a cement tube- used to prevent gas migration into the water supply. If this occurs there are health and safety issues to consider, as well as socio economic problems with property and resale values of homes and land. These issues presented serious concerns to rural communities.

Prior Shale Gas Development Issues

Through the course of research on the effects of shale gas development in communities, much information was gathered from current sources, such as basic internet, and YouTube searches, as well as personal conversations with people in areas where shale gas development has occurred in the past. These areas include DISH, Texas and some parts of Green and Washington County, Pennsylvania. From these sources, emergent topics were found and used to build the base for this work. The concerns uncovered are discussed in the following paragraphs.

As stated earlier, educational differences are common between rural and urban areas and many rural residents who do receive formal training leave their community in search of more skilled and higher paying jobs (Goetz & Rupasingha, 2004). Shale gas

development may bring a surplus of jobs and income to communities. Small farms that were struggling to survive may be offered incentives in the form of money for acreage to lease their land, as well as royalty checks. High unemployment rates may decrease due to jobs working in a thriving new industry. Towns with dying industry may be given another chance to prosper with the addition of shale gas development. These are large changes that communities and residents need to adapt to.

When a new industry enters an area, new workers follow. This can lead to many changes within the community. The term “riff raff” has been used by some local residents to refer to the outsider workers who enter an area to work on deep gas well development. These people will interact with native residents. They may bring an increase in town violence, as well as an increase in drug use and trafficking in areas where drilling is occurring. This was mentioned by residents of a town where shale gas development boomed, with a possible reason suggested for this occurrence being the use of methamphetamine, which may help workers stay awake during long drilling shifts. Industry workers may not be aware of local laws and ordinances, which could cause an increase in crime. There is the possibility that rural areas will be unable to provide adequate law enforcement resources to assist with an increase in crime if it occurs. Community leaders and residents must figure out how these changes will be dealt with if they occur.

Jobs may become available when development is occurring in an area. Instances of local companies going out of business have been suggested by residents of small towns

in the Midwest that have undergone shale gas development. This is happening because they are unable to keep employees due to them leaving for higher paying jobs with oil and gas companies. When the drilling process is completed in an area there may not be other local jobs for people who are laid off from the gas industry. This shift may have an impact on delicate local economies.

Town spending is affected with shale gas development in the area. When there is a drilling boom, some towns increase their budget, as there is more income to the community. However, after the wells are completed and there are fewer people contributing to the community economy, these towns may be unable to keep up with the level of spending they have become accustomed to throughout the boom now that the rush has subsided.

Local townships may be burdened with extra costs from shale gas development, whether or not it is taxed. There can also be an increase in local accidents as small roads, common in many rural areas, have not been engineered to support the big trucks and the increase in truck traffic that occurs when drilling commences. Local townships may not have the resources needed to repair the roads now, or in the future after the wear and tear from drilling traffic has subsided.

Reports from residents in some areas indicate that there may be pressure to lease one's gas and oil rights, especially if neighbors have done so. There have been stories from communities about disagreements between neighbors due to them taking opposing stances on shale gas development.

In areas where shale gas development is occurring, local governments may increase their budget to support new residents with resources such as larger schools, hospitals, and businesses. If expenditures are made to improve town resources, what will occur after development has subsided? Will communities be able to adjust budgets to support larger agencies when outsourced workers leave the area? Will local housing markets be affected due to buying and selling of homes with the influx of jobs?

Overview of Research

Shale gas development and the extraction process it utilizes are presenting environmental justice concerns for communities and residents. This work explored how individuals in rural communities perceive change due to shale gas development in Laurel Highlands, an area located in the Appalachian region of Southwestern Pennsylvania. The approach was carried out using a qualitative research methodology incorporating several sources of information. A majority of information was comprised of interviews with residents of the Laurel Highlands, which was triangulated with reviews from various media sources, including print and internet sources; describing what was occurring in the area as shale gas development occurs.

Area Studied

The Laurel Highlands, located in Southwestern Pennsylvania, was chosen as the location to be studied due to the influence of shale gas development, its unique landscapes, as well as its proximity to the researcher. It is true that in some surrounding areas, such as Greene and Washington County, Pennsylvania, more shale gas

development has occurred than in the Laurel Highlands. However, fracking has and will continue to occur in this natural resource rich area. As of June 2013, over 30 unconventional wells have been drilled through a stretch of the Appalachian Mountains in the Laurel Highlands. This number will continue to grow with more than 20 permits issued for more exploration and production of unconventional wells. Residents in this area will continue to experience shale gas development.

The Laurel Highlands includes three counties which are Fayette, Westmoreland, and Somerset, and is located southeast of Pittsburgh, Pennsylvania (*Figure 2.1*). It is a popular attraction in the northeastern United States for its outdoor recreational activities, including skiing, whitewater sports, hiking and biking. The area is a short drive from urban centers such as Pittsburgh, PA and Washington D.C. It is also less than six hours from New York City, NY and Philadelphia, PA (see *Figure 2.2*). The Laurel Highlands is home to a variety of attractions including: vintage amusements parks, ski resorts, three Frank Lloyd Wright designed homes – Fallingwater, Kentuck Knob and the Duncan House, historical sites that include Fort Necessity, the Flight 93 National Memorial, and the Johnstown Flood National Museum, as well as numerous state parks and outdoor recreation sites which are home to water and mountain activities. *Figure 2.3* illustrates many of tourist attractions available throughout the Laurel Highlands region.

Summary

This chapter provided a brief outline of rural communities and natural resource extraction that has occurred in these areas. It introduced readers to shale gas development

and the Laurel Highlands. In the following chapter, the methodology utilized to explore the perception of individual and community change as shale gas development occurs in rural areas is reviewed.

Figure 2.1. The Laurel Highlands

Figure 2.2. Laurel Highlands Distance from Major Cities

Source: laurelhighlands.org (2013).

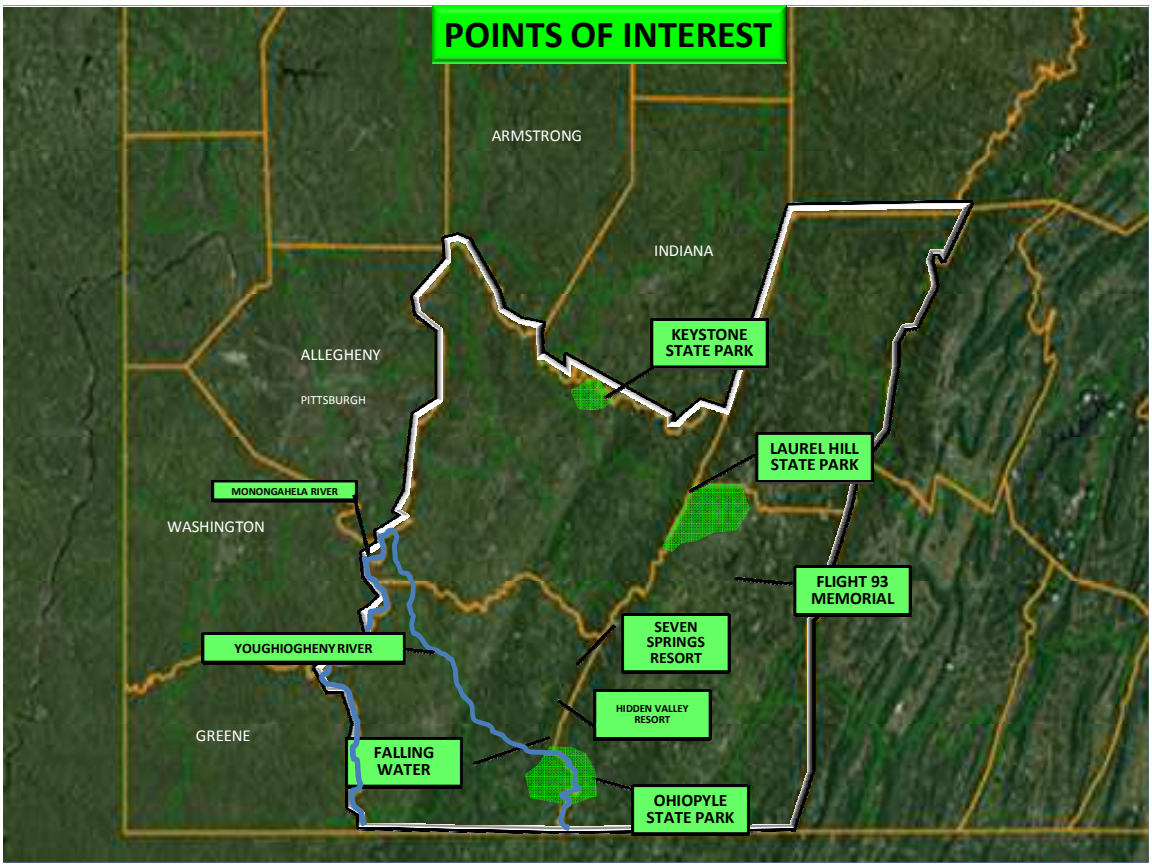

Figure 2.3. Map of Laurel Highlands Attractions

CHAPTER 3:

METHODS

Previous chapters explained why there is an interest in shale gas development and provided information regarding rural community changes from industry. The purpose of this chapter is to present the methodology used to answer the research question, "What is the perception of individual and community change when industry enters the area?"

Research Design

This work was an exploratory study of the perceptions of rural residents regarding the impact of shale gas development in their community. The research used a phenomenological approach. The research question was explored through semi-structured interviews conducted with 20 residents of Laurel Highlands who reside within 10 miles of a natural gas extraction site where fracking has occurred. The interview information gathered was triangulated with media sources from the internet and print, in order to help examine different opinions of the drilling industry (Berg & Lune. 2012).

From the information gathered, themes were identified to see how individuals perceive change and transitions in the Laurel Highlands that are taking place due to the impact of shale gas development. This approach focused on one area, provided rich descriptions of the lived experiences of residents there, and depicts how the community

and residents have been affected by change from shale gas development (Bowen, 2005; Holstein & Gubrium, 1994).

Why This Approach?

There are various approaches that may be employed in qualitative research to capture data. These include case studies, narrative research, ethnography, grounded theory research, and phenomenology. Each of these approaches allow in depth analysis ranging from the personal (micro) level, which may be examined in a case study, to an entire cultural analysis, carried out through an ethnographic approach. This work was looking for perceptions of a phenomenon.

A phenomenological approach was chosen to carry out this qualitative work, as it best drives the research question. The work examined perceptions of community change, and phenomenology seeks understanding of a shared experience (Creswell, 2007). This approach was chosen, as opposed to the four other qualitative approaches, due to the descriptive nature of information that may be obtained through a phenomenological study. This work describes the essence of the lived experiences of rural residents experiencing shale gas development from the natural gas industry. What is illustrated in the findings section supports the use of a phenomenological approach for this research question.

A narrative approach may have limited what the participants could include and details that would be too minute to study a broader phenomenon. Grounded theory was not utilized, as this work was not looking to generate at theory about community change

due to the natural gas industry. An in depth examination of what was occurring in the Laurel Highlands helped to better understand the phenomenon of shale gas development and needed to be completed before a theory should be applied. This work did not focus on an entire culture or group, as an ethnographic study would examine. Instead, it looked at a single area and explored one issue, as in case study research. However, the essence of this work were the multiple interviews exploring how individuals perceive community change. That is why this study needed a phenomenological approach and this method was utilized for this research question.

Research Development

This research began by reviewing scholarship from various fields regarding natural resource extraction industries, including economics, geographic science, and political science, in order to learn about shale gas development from other perspectives and the basics about the process. Online media content focusing on communities where shale gas development has or is occurring was also examined. These sources provided background information about the issue and highlighted where there were gaps in the knowledge base. From this it was concluded that an in-depth qualitative study exploring perception of change from industry was warranted.

Potential interview questions were piloted with a sample that had similar demographics as the actual interview subjects. Informal conversations with community residents engaged in shale gas development were done to ensure that the questions being asked were appropriate for the research facilitating the study of the phenomenon. During

these preliminary discussions, notes of topics that were brought up in these conversations were taken. This also helped to sharpen interview skills and expand the researcher's knowledge base regarding the topic. The final questions contained in the in depth interview guide were developed after engaging in community discussion, reviewing online media content, and exploring sense of community theory. *Appendix C* contains a copy of the interview guide that was used.

In depth interviews were chosen because key informants working in the community felt that the population being studied would be responsive to open ended exploratory conversations about the topic. Interviews also offered several advantages over mailed surveys. Carrying out the interview verbally allowed respondents to provide more details and context to their answers and to allow for additional follow-up questions to clarify for their responses (Johnson, 2002; Schutt, 2012).

To strengthen the results obtained when using a phenomenological approach, questions recommended by Creswell (2007) were incorporated into the interview guide. He recommends two general questions be asked to help gain "textural description and a structural description of the experiences, and ultimately provide an understanding of the common experiences," (2007, p. 61). There were adapted to this research question and are inserted as the first two questions asked to respondents. These are: *Question 1*, "What is your perception of your community?" *Question 2*, "How do you feel your perception of your community has changed with the addition of the natural gas industry?" These

two questions were used in order to help capture the essence of the phenomenon being studying.

It should be noted that the interview guide is longer than recommended. Follow up questions were included as prompts to be used if necessary and were based on issues that occurred in other areas where shale gas development took place. This was done intentionally to gain information about how participants view change brought on by industry in any ways that were similar to residents of other areas.

The interview guide also contained questions with ordinal responses used to gather demographic information and provided a small quantitative component to the work. These responses are presented in the findings section of this dissertation in a table depicting income, time living on the land, amount of land owned education and family size. Many of the questions which used ordinal measurements also had qualitative follow up questions. This is done so that the respondent was able to elaborate on their thoughts and responses could provide deeper insight into the quantitative responses given (Schutt, 2012). These qualifying answers are discussed in the findings sections, as well as in the appendix in this work.

In order to further develop the interview guide, research regarding sense of community and how it is defined and measured was reviewed. Specifically, McMillan and Chavis' work from 1986 which describes components contributing to one's feeling of sense of community was examined. The *Sense of Community Index-2* (Chavis, Lee & Acosta, 2008) was studied at to determine how community perception is measured

quantitatively. Sense of community aided in framing aspects of the qualitative questions in the resident interview form. These questions included: *Question 8,* which looked at fulfillment of needs; *Questions 10* and *11* which examined membership and community influences; and *Question 9,* which looked at participants and their connection to their community.

Participants

The Laurel Highlands is an area with large differences between the 600,000 plus people who reside there. Not all residents live in the community full time and may reside only seasonally to engage in the winter or summer activities the Laurel Highlands has to offer. This skews the socioeconomic data available for some parts of the region, as million dollar resort homes may be only a few miles from hovels. Due to these incredible differences, the sample was not limited to one socio economic population.

In order to develop the pool for this phenomenological study, participants were chosen via criterion sampling as recommended by Creswell (2007). All participants met the criterion of living within 10 miles of a site where fracking has occurred. *Figure 3.1* illustrates the participant homes in relation to unconventional drilled wells in the area. Polkinghorne (1989) suggests that the number of participants interviewed for this type of work ranges from 5-25, with the final number of subjects being determined when the data is saturated (Creswell, 2007). A final sample of 20 individuals were interviewed for this work. Participants were willing to be interviewed, spoke English, were aware of the topic being studied and were between the ages of 18-65.

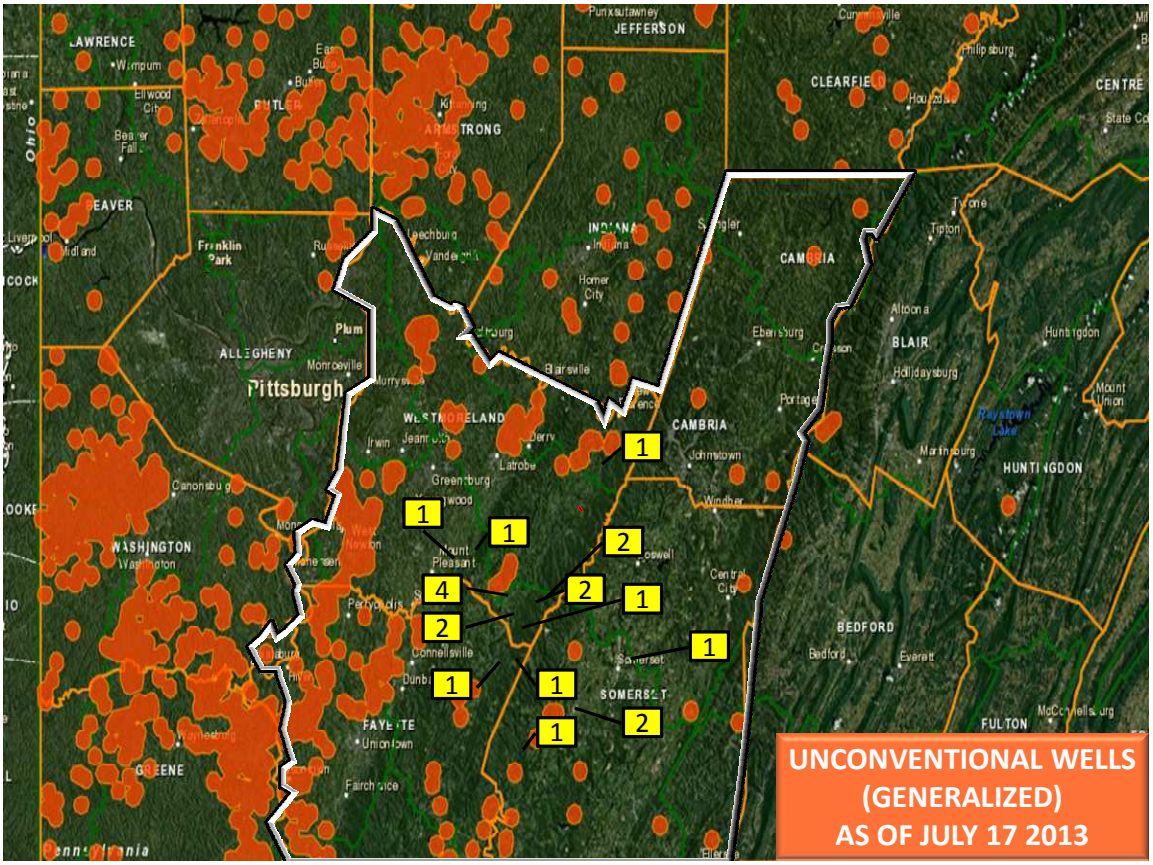

Figure 3.1. Map of Participant Homes in Relation to Unconventional Wells

***Yellow box indicated post office in community where participant(s) reside.

Source: Fractracker.org (2013).

Resident Interviews

In depth interviews consisted of qualitative and quantitative questions in the semi-structured form (Baxter & Jack, 2008). Interviews ranged from approximately 20 to 65 minutes in length, depending on participant time constraints, willingness to answer questions, and information they possessed (or wanted to share with the researcher) regarding the topic. The interview began by framing the conversation using the guidelines listed by Lee (1999) which included letting the subject know that this work was being done as part of a dissertation, reviewing a brief statement of what was being studied, providing information about the types of questions were going to be asked, and letting the interviewee know that they were going to be recorded the interview and that notes may be taken. A copy of the informed consent form (*Appendix D*) was reviewed with the participant, and any questions the respondent had about what was being studied were answered.

After participants gave consent, recorded interviews and transcripts were identified on both paper and electronic documents by a number given to them by the researcher to ensure confidentiality, as stated on the informed consent form submitted to the *Institutional Review Board* of the *University of South Florida*. Two digital voice recorders were used to tape interviews in order to make ensure a backup existed in the event the data was compromised.

During interviews, occasional notes were taken about what was being said, mainly as a way to prompt for follow up questions, or as a reminder to look something up at a

later time. Throughout the conversation, responses were gauged for silence to determine respondent's level of comfort with questions. Participants were encouraged to speak freely about how they felt their community has changed due to shale gas development. The meaning participants attached to their experiences with the natural gas industry's development in their community was explored by follow up questions. These questions were used as prompts for more in depth exploration of the topic and came from a list of questions provided on the interview guide that was used for this work.

A majority of the respondents were very engaged in the conversation and needed little prompting to provide in depth descriptive accounts or their personal experiences. This helped to capture the in depth qualitative information about community change perceived from shale gas development, as the participant was willing to share his or her experience. Following conclusion of the interview, participants were asked if they may be contacted at a later date to check the contents of their statements; to engage in member checking. All participants agreed to this.

Analysis of Data

A copy of the digitally recorded interview was taken and converted to an Mp3 file. Each of these files, identified by their code numbers, was outsourced to a professional to be transcribed. This was done in order to ensure accuracy of the transcription. As stated in the informed consent form approved by the *IRB,* digitally recorded interviews, transcribed interviews and completed interview guides were stored in a digital folder on a flash drive secured in a locked drawer located in the research's

office. Data is being stored for five years after the date of the interview. At this point, the USB drive will be destroyed.

Follow up calls were placed to seven participants after the data was transcribed, initially reviewed, and the recordings were listened to. These follow up calls were done to ensure that the work accurately captured what the participants were trying to say, and to ensure that they have been transcribed correctly. The participants who were contacted needed to clarify statements after review of the transcripts, as there was some confusion about the language that was transcribed. This was a process of member checking which was utilized in this research as a way to enhance the rigor of the work.

For the purpose of this work, themes about community change were the perceptions of at least seven participants, or 35% of those interviewed. Themes were developed in this manner, despite the recommendation that "typical" themes were brought up by 50% or more participants (Hill, Knox, Thompson, Nutt Williams, & Hess, 2005). Themes were developed this way to account for the responses of three industry insiders that were part of the sample, as it was thought that their employment may contribute to differences in the of experiences, reactions and response to industry moving into the area.

Techniques that were developed by Moustakas (1994) and recommended in Creswell (2007) were utilized for data analysis to improve the method. For organization, articles were sorted into electronic files according to date and topic to begin deriving patterns and themes in the information. Transcribed interviews were read through,

reviewed and listened to intently in order to hear what was said and how it was presented, which provided a more holistic concept of what was being said (Moustakas, 1994). Corrections were made as necessary to the transcriptions, which included updating sections the original transcriptionist stated were “inaudible” if possible, and filling in colloquialisms and local landmarks that the transcriptionist was not able to identify.

In this research, the transcripts were read thoroughly and notes taken as to which topics surfaced most often to help develop holistic codes (Saldaña, 2013). *Table 3.1* provides some of the terminology that was used to develop codes. The terms were chosen as they occurred the most frequently during the initial one on one interviews and while reading through the transcripts. The table does not provide an exhaustive list of all terms that were highlighted. Those listed allowed for initial identification of codes in the transcripts. Some terms overlap. These terms and phrases were analyzed and sorted through more in depth through more critical analysis during later stages of coding.

Following these initial data analysis steps, Moustakas (1994) recommended *horizonalization* to help find *clusters of meaning*. Horizonalization is defined by Creswell (2007) as “the researcher lists every significant statement relevant to the topic and gives it equal value,” (p. 235). This horizonalization was completed as the transcripts were reread and statements were highlighted and listed under the various topics that emerged in the transcripts. A color was chosen for each category and highlighted while reading through each transcript, enabling for the clustering of topics that are similar or recurring to help group them together. Statements were determined to have significance

Table 3.1. Holistic code guide

Initial code	Terms
Impacts	Environment, water, lake, river, stream, air, wildlife, animals, earth, health, anxiety, fear, threat, landscape, worry, tension, negative, impacts, change, threat, frustration, landscape, stress, quality, disrupt
Industry	Traffic, truck, change in area, views, anxiety, landscape, workers, change, company, industry, rural, industrial, change, tourism, recreation, disrupt, quality
Community	Leasing, action, pressure, legislation, neighbor, landscape, live, home, power, control, loss, fight, anger, help, protection, need, stability, not knowing, respect, exploit, threat, frustration, information, regulation, laws, local, outside, organization, disrupt, threat, change
Economics	Money, jobs, poor, checks, jobs, work, company, hired, industry, workers, "keep the gas," name of state outside of PA, name of country outside of U.S., anger, heat sources, fair

if they pertained to perception of community, change, and industry, as well as needs or actions that have developed based on any of these factors, such as community protection, information or action. The groups were examined to see what they had in common and from these common experiences, themes emerged (Creswell, 2007).

The qualitative software analysis program ATLAS.ti™ was used to organize data and codes. Highlighted transcripts were uploaded as primary documents into the software. From here, the program was used to assist with organizing codes, memos and

themes. ATLAS.ti™ provided an alternate method to ensure accuracy of coded data and to ensure the researcher did not miss phrases or codes, such as a highlighted statement containing a word that could fit into more than one category.

After significant statements were gathered, clustering the data began by categorizing similar significant phrases into groups (Moustakas, 1994). This was done for each of the interviews until an exhaustive list of all meaningful statements was comprised. Themes uncovered in this research were formed by combining groups of related categories and reassembling into meaningful patterns (Yin, 2011).

The final themes are discussed in *Chapter 4* and *Chapter 5*. A section of themes pertaining to resident needs and suggestions was also categorized, as a majority of participants discussed their recommended ideas for industry and community change. Recommendations for methods social workers may use to meet these needs is found in *Chapter 6*. Full excerpts of resident recommendations are found in *Appendix E*. If a theme was not discussed by 35% of the respondents, but was prevalent in the literature, despite only being mentioned by a small percentage of participants, it was noted. These few sub-themes are discussed in the following chapters.

Following the steps discussed above, textural and structural descriptions of the phenomena were provided by writing both descriptive and experiential accounts of what occurred (Moustakas, 1994). As recommended by Creswell (2007), these depictions were woven together to illustrate the fundamental nature of what occurred. Creswell (2007) states that by reducing "the *textural* (what) and *structural* (how) meanings of

experiences to a brief description that typifies the experiences of all the participants," (p. 235), the common experience can be found.

The findings and discussion sections of this work illustrate what was experienced texturally and structurally for both the individual subject, as well as textural and structural descriptions of the phenomenon for the interview group as a whole. This was done in order to explore the common group experience had by a majority of participants, or the essence of the phenomenon (Moustakas, 1994). *Chapter 5* of this work contains a review of how the research findings relate to prior topics found in other communities where shale gas development is occurring which were highlighted in *Chapter 2*.

Addressing Methodological Issues of Trustworthiness

***Strengthening the approach*.** In order to strengthen this research, the methods suggested by Drisko (1997) were utilized; providing six areas for attention to improve qualitative research methods. The first is to provide the framework. A qualitative approach was utilized in order to help explore and understand what is occurring in rural communities as the natural gas industry enters the area. Using a phenomenological approach was appropriate in order to describe the experiences of individuals and look for meaning in what was occurring in their communities (Creswell, 2007).

The second criterion Drisko (1997) discussed was to identify to whom the work is directed towards, as well as what is it the researcher would like to accomplish. This work describes how individuals view change occurring in the Laurel Highlands and demonstrates the change that is occurring in the area various levels. Social workers are in

a prime position to provide education about community change as it is occurring. Findings from this work allow social workers to advocate for and be supportive of rural residents.

Drisko's (1997) third specification was to review the methods that will be employed. Those topics were addressed earlier in this chapter.

Criterion four, as defined by Drisko (1997) states to label possible biases. Interview questions may be viewed as biased due to the researcher being a social worker, female and from the area. This is where reflexivity is very important. Because this work is qualitative, it permitted an active and self-aware role of the researcher in the work which was done by remaining cognizant of why this topic was chosen (McNair, Taft, & Hegarty, 2008). It was also important that journaling, bracketing out biases, getting feedback throughout the research by using a reflective person, and discussions with the dissertation committee were useful (Hand, 2003).

Social work ethics, which are Drisko's criterion five, were upheld in order to help strengthen qualitative research (Drisko, 1997). There were limited ethical considerations regarding this study. Information was provided to participants about the study, confidentially, and any other special considerations regarding voluntary participation in this research project. As added insurance, in August 2012 the *Collaborative Institutional Training Initiative's Human Research Curriculum Refresher Course* and *Social and Behavioral Responsible Conduct of Research Curriculum* were taken in order to refresh researcher skills. The final criterion is addressed in the discussion section of the work,

which provides acknowledgement about the limits of transferability, and discussion regarding the scope of specific findings of this work (Drisko, 1997).

Triangulation

Media sources. The use of interviews, as well as an analysis of media including on-line newspapers, various other internet sources, and visual news reports all added to the richness of this study. During the proposal phase of this work, a database was created containing articles and videos from the internet, local and national newspapers, all pertaining to shale gas development, the natural gas industry, fracking, and/or the effects each has had on various communities in the United States, including the Laurel Highlands.

Building the database continued throughout the interview process. The media information that was triangulated with interviews spanned from the month interviews began (January 2013) to the month interviews ended (May 2013). This was done in order to ensure the newspapers and online materials were current and were the same information that participants had access to while they were being interviewed.

In order to make sure that the media gathered was manageable, two specific local newspapers were chosen to be reviewed; the *Herald-Standard* and the *Greene County Messenger.* These papers were selected because the Laurel Highlands does not have its own media publication specific to the area. Instead, residents have access to information from surrounding counties.

Another component of this research included review of industry that has occurred in the area through online media. Specifically, community history of resource extraction, natural resource tourism, local ordinances, local government information and farm statistics were examined. Maps in this work were used to elucidate points brought up in interviews regarding the following areas in order to address ecological issues (Berg & Lune, 2012): overall area, water systems, gas well sites, participant homes in relation to gas well sites, tourism and recreation sites located in the Laurel Highlands. These maps provide an illustration to readers as to the makeup of the area being examined in this work.

Bracketing. Creswell (2007) recommended bracketing out the researcher's personal experiences when carrying out a phenomenological approach. During the planning stages of this work, the intent was to constantly review media information to keep current throughout the interview and writing process as a way to triangulate data gathered from individual discussions with information from other sources. However, after completing the initial two interviews, it was determined that the review of media information should be limited during the interview process. This change in approach occurred after finding that being extremely aware of what was occurring in the community regarding shale gas development affected the ability to carry out the work in a role as an unbiased researcher. Perceptions of what was being said by the participants were too influenced by current media knowledge. Therefore, media sources were limited to strictly compiling data during the interview process and were reviewed and

triangulated when interviews were completed. This was one of the techniques utilized to bracket out researcher biases.

Reflective coder. To ensure truthfulness of the work, conversations with a source outside of the social work field were carried out. This source was intended to be utilized as a second coder, in order to help clarify themes, reduce the possibility of unnecessary bias from the researcher with the professional values of a social worker and engaged in the Laurel Highlands community. However, it was not possible to find a "second coder". Instead, a "reflective person" was utilized in this role instead. The reflective person encouraged bracketing out any unnecessary personal influences or views that may have been included in the work (Creswell, 2007; Moustakas, 1994) and helped to ensure that the work was understandable to those outside of the social work field.

The reflective person was provided the research proposal, IRB application, a copy of the interview guide and a confidentiality agreement to review. After reviewing the information and signing the agreement, he was given the transcribed interviews for document review. The reflective person also followed the holistic coding process by Saldaña (2013), and provided broad codes and general themes from the interviews. Interpretations of themes of the text were written by the reflective person at the end of each interview. Throughout the research process, the reflective person stressed objectivity to the researcher and he also recommended staying away from local media sources reporting on drilling activities in order to maintain focus on the purpose of this work.. While reviewing the researcher's work, the reflective person provided feedback about the

writing. This feedback was used as another way to bracket out researcher bias and personal experiences to the work.

*Journaling***.** Another technique incorporated in the work to assist with bracketing out preconceived notions was journaling. In order to do this, a written log was kept to describe research feelings and how what was being studied affected the process. Emails to people involved in this work, including professors, the reflective person, and community members who are active and possessed much knowledge about the topic were filed and compiled. This helped separate personal feelings from those of the study participants. Researcher biases were described and available for review by the reflective person during document analysis and throughout the writing process.

Time Frame

IRB approval for this work was granted in December 2012 and initial participants were drafted. Interviews started in January 2013 and continued through the first week of May 2013. During this four month period, interviews were completed, transcribed and reviewed. Follow-up phone calls with participants were done as member checking to add to the strength of the work.

Data analysis began in May 2013 and writing was continuous from that month through October 2013, as work was done to summarize the experiences and draw conclusions. During the entire process, there was contact with the outside coder so ideas could be bounced around and discussed. This aided in making the analysis and writing

process more efficient, as many ideas had been mapped out through conversations with someone outside of the social work bubble.

Summary

In this chapter, key points of the work were discussed, including techniques that were utilized to gather information for the work. It also discussed data analysis techniques, including coding and development of the key themes that were uncovered in this work. *Chapter 3* reviewed how and when the research was carried out and data was analyzed. The following chapters review the themes uncovered in this research.

CHAPTER 4:

INTERPRETING THE RESEARCH FINDINGS

This chapter presents respondent demographics and identified themes from this study. Significant themes emerged which indicate a range of personal and community level concerns. The impact of shale gas development to Laurel Highlands' residents is discussed.

Respondents

This work examined respondents from three counties of the Laurel Highlands: Westmoreland County, Fayette County and Somerset County. A sample of twenty individuals was gathered through criterion sampling, the criteria were mentioned in Chapter 3. Respondents ranged in age from 32 to 61 years of age. There were 8 men and 12 women who were either full or part time residents of the community. Fifteen participants owned land in the Laurel Highlands, four participants grew up in the area and live on land that their parents own, and one participant is living in the Laurel Highlands for a job and rents a home in the area.

The initial sample of two was contacted in January, 2013 and interviewed. After each interview, the respondent was asked if he/she could recommend possible subjects that fit the sampling criteria and would be open to being interviewed. Given familiarity

with the area and access to various community groups involved in this issue, it was erroneously assumed that soliciting participants would not be difficult.

Initial contact to arrange the interview was made with suggested participants via a cold telephone call. Introductions were made and background of the work provided, followed by a review of the research question. Potential participants were made aware that they may choose a time, date and location to complete the interview if they chose to do it and were provided contact information of the researcher to use if they decided to participate. Of the seven people suggested, one person did not return calls after three messages. Another person said he would consider being interviewed and would be in touch if he decide to do so. He did not return the phone call. A third resident suggested suffered a serious illness, and was too ill to meet. The fourth person suggested was involved in an accident and had an injury which prevented participation in the work. Two more suggested participants never returned calls after detailed voice messages. Finally, one of the seven suggested people agreed to be interviewed for this work. After this initial setback, later participants provided more people to contact for the research.

Table 4.1 depicts demographic information gathered from the quantitative section of the interviews. The table includes: age, sex, the length of time each participant has lived in the Laurel Highlands, how much land participants own (if any), whether or not they own their gas and mineral rights, their household income range, employment status, education level, and number of people who are currently residing in their household. Please note that due to confidentiality restrictions, the ages are approximate, and are used

for descriptive purposes only; providing a general idea of the age range of the resident when discussing their perceptions. As this sample came from a small, rural area, providing exact ages could have easily breached the confidentially of some of the participants. *Table 4.2* depicts the averages of sample compared to the demographics of the general Laurel Highlands population.

The sample was diverse in employment. Three residents worked in the natural gas industry in various capacities. These participants included a driller, pipeline worker and a former land man. Three other residents were employed as community organizers working with Laurel Highlands residents on issues arising from shale gas development. The remaining sample included ten residents employed in a variety of careers, three retirees, and one stay at home parent.

Respondents' perceptions of the Laurel Highlands. Throughout the course of interviews, residents discussed why they choose to live, either full or part time, in the Laurel Highlands. Respondents cited the excellent quality of life the area offers including the many recreational opportunities, and scenic beauty. One resident described the choices of activities by saying "There's snowboarding available, there's good hiking, there [are] rivers and creeks to play in, there's fishing and mushroom hunting; so lots of fun outdoor activities in the Laurel Highlands." Another stated that "I love my community. I like that it's [a] small town in nature that everybody knows everybody. There's little crime. The scenery is beautiful and the changes of season are nice."

Table 4.1. Participant Demographics

ID	Length of time in LH	Acres Owned *	Own Gas Mineral Rights**	Income Range	Employment	Education	# In Home	Sex	Age
1	> 20	>10	Y	35,001-60,000	Retired	Bachelors	4	M	61
2	>20	>10	Y	35,001-60,000	Employed	Masters	4	F	57
3	>20	>10	Y	35,001-60,000	Retired	Bachelors	1	M	57
4	>20	>10	N	>60,000	Employed	Masters	2	F	57
5	>20	6 to10	Y	>60,000	Unemployed	Bachelors	4	F	36
6	6 to 10	6 to 10	Y	>60,000	Employed	Masters	4	M	57
7	>20	>10	Y	>60,000	Employed	Bachelors	4	F	36
8	>20	>10	Y	>60,000	Employed	Bachelors	3	M	57
9	>20	1 to 5	N	>60,000	Employed	High School	2	M	41
10	>20	1 to 5	Y	35,001-60,000	Employed	Bachelors	1	F	36
11	>20	>10	Y	>60,000	Employed	Bachelors	2	M	33
12	6 to 10	1 to 5	Y	>60,000	Employed	Masters	3	F	36
13	>20	1 to 5	Y	>60,000	Employed	Masters	1	M	36
14	>20	>10	U	35,001-60,000	Employed	Masters	2	F	41
15	1 to 5	0	U	35,001-60,000	Employed	Trade	2	M	51
16	16 to 20	>10	Y	>60,000	Employed	Masters	1	F	52
17	1 to 5	1 to 5	U	>60,000	Employed	Bachelors	1	F	52
18	>20	1 to 5	U	20,001-35,000	Unemployed	Masters	1	F	36
19	>20	1 to 5	U	10,001-20,000	Unemployed	High School	2	F	36
20	1 to 5	0	N/A	20,001-35,000	Employed	Bachelors	1	F	32

* > 10 acres can mean up to 110 acres.

** U = Unknown

Table 4.2. Participant Demographics Compared to Laurel Highlands' Population

Demographics	General Laurel Highlands' Population	Respondents
Persons between 18-65 years of age, percent, 2012	61.5%	100%
Female persons, percent, 2012	50.1%	60%
High school graduate or higher, percent of persons age 25+, 2007-2011	86.2%	100%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	17.5%	85%
Homeownership rate, 2007-2011	76.1%	70%
Median household income, 2007-2011	$42,229	$40,000
Persons per household, 2007-2011	2.4	2.2

Source: United States Census Bureau, 2013

The owner of a 100 acre farm stated "When you live in a rural community, you are living there because you have family roots or because you really like the land."

The following statements reveal how Laurel Highland's residents value their land and what the area has to offer. The environment provides an escape from more fast paced urban environments. This ability to decompress and relax is a draw for people to reside in the area. Residents also cite removing distractions from more bustling communities as another draw for the area:

> *The majority of my relaxation is inside of the Laurel Highlands… [It's]a nice shift away from housing developments and the hustle and the bustle of*

the city. So it's sort of like a natural retreat. And it's of course it's beautiful, which I really appreciate. Just the natural beauty and the serenity that goes along with that kind of an environment… (Resident 13)

I like the tranquility. I like being close to nature. I like the clean air and the clean water and quiet. The solitude the kind it provides. I also have a home in Pittsburgh and I certainly like getting away from it.

For me, it's keeping it simple, keeping the distractions away and not dealing with the things that you don't have to deal with just as a question of where you live. I don't hear sirens. I don't hear the domestic fight across the street or anything; those are just things that you put up with in a more crowded place. It's far better than sitting on a porch in suburbia listening to the neighbors. (Resident 3)

Laurel Highlands' water. The Laurel Highlands is a very water rich area, a topic residents brought up when discussing why they live in the area. It is home to an abundance of streams, creeks, lakes and rivers. The waterways are vital to daily living, supplying residents with potable drinking water. The water in the Laurel Highlands is also used to attract tourism, as people come from all over the globe for recreational activities in the watershed. White water rafting, kayaking, fishing, boating and even snowmaking for skiing are all activities people flock to in the Laurel Highlands. Many residents of the area live here for all that the water has to offer them on a daily basis.

Over in the Indian Creek Valley … it's kind of a main thoroughfare. People come there from surrounding areas, largely Pittsburgh, to hike on the Laurel Highland hiking trail and also bike, and it's a tourist attraction in the summer months. Even kayaking on the Allegheny… It's really rich. It's Pennsylvania. It's filled with waterways. There are lakes and ponds. We would go canoeing a lot when I was a kid… I think water is really important to maintaining that lifestyle that's there, absolutely. The lifestyle that I grew up with… (Resident 10)

There's been no mining through here, not on this ridge anywhere. So, that's an untainted water source and it's a 12-month spring. It feeds these three ponds and when we were little kids came up from Indian Head so

> *they could swim and fish in these lakes because Indian Creek was impossible. It was as orange as a street sign. So this is where they came and it's also fun to see now the fourth generation little kids catching their first fish in these ponds. (Resident 3)*

Despite the large number of waterways in the Laurel Highlands, there are still concerns about the water quality. A community history of various types of mining and coke production has caused damage to the once pristine quality of many streams. Local watershed conservation groups have been working to remedy this damage caused from past industry in the area. One resident expressed appreciation for what grassroots watershed organizations have done for Laurel Highland's waters systems:

> *With the watershed association, they're just amazing with what they've accomplished and I have spent my entire life fishing or walking through or swimming in these streams and to see what they've accomplished - you know, this area was destroyed by strip and deep shaft mining, I mean it really was. I think we had the only creek in the neighborhood that wasn't orange.*
>
> *But the watershed association singlehandedly has cleaned that up. Indian Creek is wonderful now as a lot of the other tributaries and I just think they've done such a lot. To be honest with you, I think I owe them something, I really do. I have a debt of gratitude that I have to return to them for the masterful job they've done. (Resident 3)*

Water concerns in the area were highlighted nationally in 2009 because of issues with a Laurel Highlands' waterway, *Laurel Hill State Creek*. *American Rivers*, a national conservation organization which helps to restore and provide protections to America's rivers, listed *Laurel Hill State Creek* as the seventh most endangered river in the country, based on impending threats to the river and the importance of the waterway to the community (American Rivers, 2009). The main reason for the inclusion of this tiny waterway was that "the creek lacks safeguards to protect it from excessive water

withdrawals for development and energy extraction," (AmericanRivers.org, "Most Endangered Rivers," 2009). The addition of this stream to this list encouraged local government to prevent permitting for a water bottling plant which would have further taxed the creek which supplies water to 2500 Laurel Highlands residents, and "set a precedent for protecting limited water resources in an area rich with Marcellus Shale and natural gas," (Craig, 2011, p. 20).

The appreciation of scenic beauty of the land and water, as well as recreational activities based on the environment, are key factors as to why people choose to live in the area. This work examined how shale gas development is changing this perception of community. The following sections discuss the key themes uncovered in discussion of the research question.

Key Themes

The twenty participants in this work discussed their perceptions of community as influenced by shale gas development. The experiences of the residents are described in the following sections. Respondents talked about feelings of anxiety relating to environmental and health concerns. They are angry about the outsourcing of natural resources in their area and are experiencing a loss of power and control of their communities. Residents feel that industrialization of their communities is occurring with the influx of industry. The combination of these factors is affecting residents' decisions to remain in the Laurel Highlands long term and invest in their communities. A subtheme of community action was uncovered as a way to deal with the changes occurring due to

shale gas development. *Figure 4.2* provides a graphic overview of key themes. *Table 4.3* lists the phenomenon studied, key themes uncovered and residents who report experiencing each theme.

Key theme 1: Anxiety due to environmental concerns. For many participants, perceived changes from shale gas development in their community came in the form of concerns about their health and that of their family due to environmental threats. Health concerns were tied in with water concerns and how water systems may be affected from the industrial processes involved with fracking. In this research, 18 of the 20 Laurel Highlands residents expressed anxiety about negative effects to their environment. These concerns include anxiety about water quality, air quality, effects on wildlife and vegetation, and concerns about the possibility of earthquakes occurring in the area due to fracking. In terms of demographics affecting this response, the only two respondents who did not have concerns about environmental effects were two male respondents, both of whom are currently employed for a company working on shale gas development.

Anxiety due to water quality. Like any ecosystem, the Laurel Highlands has a delicate balance of water which is used to support life and recreational activities. Changes to the watershed affect the life and wellbeing of the systems its supports. Residents interviewed in this work report fears about water contamination due to shale gas development, a change that occurred as the natural gas industry came in to the area.

Figure 4.2. Graphic Overview of Key Themes

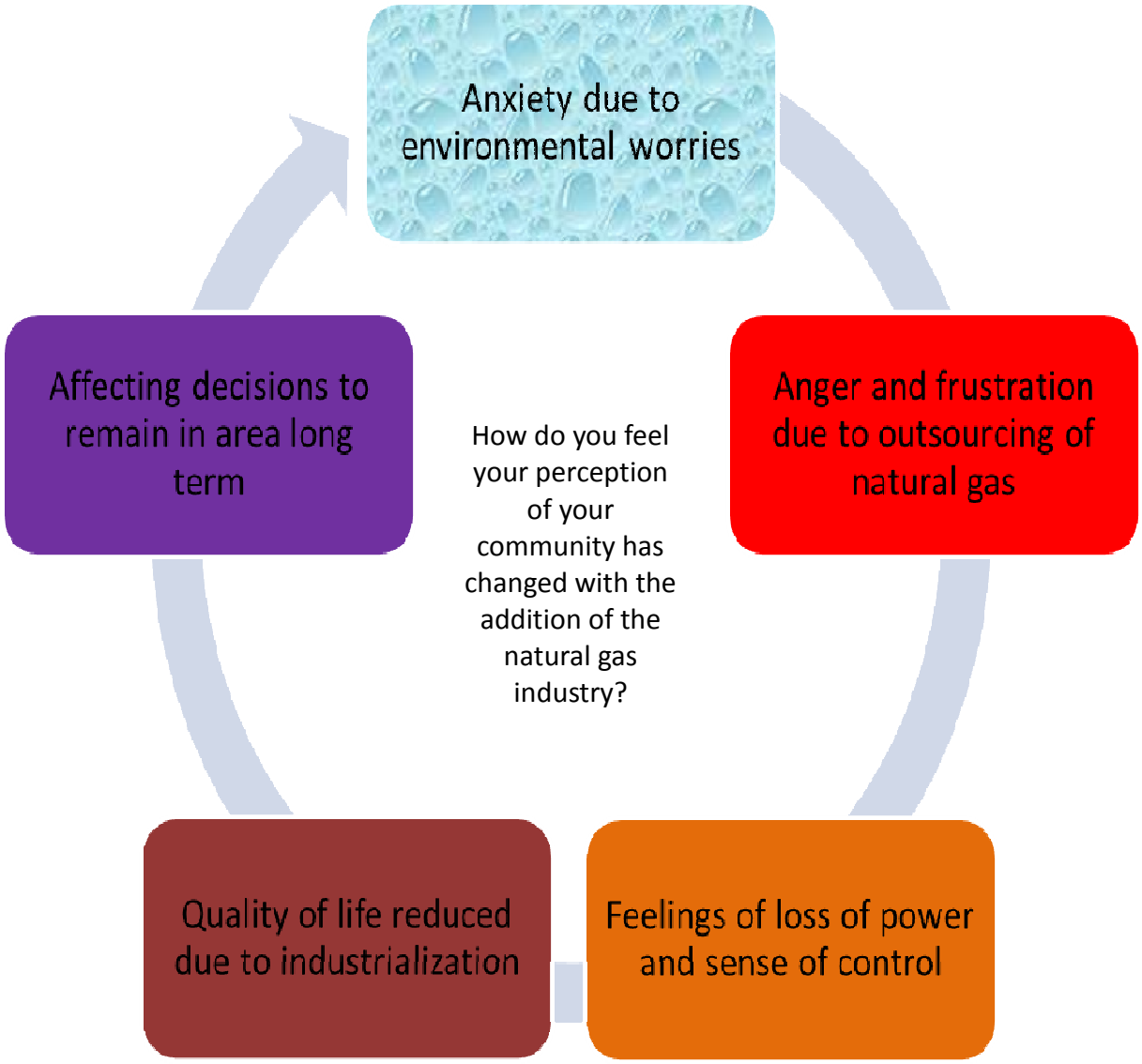

Table 4.3. Question 2- Perception of community

How do you feel your perception of community has changed with the addition of the natural gas industry?

Themes	Participants
Anxiety occurring due to environmental concerns about water, air and the land	01, 02, 03, 04, 05, 06, 07, 08, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20
Anger about outsourcing of natural resources	01, 02, 06, 10, 11, 14, 15
Feelings of loss of power and sense of control	04, 05, 07, 08, 11, 14, 16, 18, 20
Reduction in quality of life due to industrialization contributing to anxiety about what is occurring in their community	01, 02, 03, 04, 05, 07, 08, 11, 12, 14, 17, 18, 19, 20
Resident sustainability	01, 02, 04, 08, 10, 11, 12, 14, 17

Fears about water sources in the Laurel Highlands were discussed by a majority of participants. Articles in local newspapers also report water concerns occurring with shale gas development. During the time these interviews were carried out there were several articles published on this topic. *The Herald-Standard* published articles titled *Fracking Wastewater Can be Highly Radioactive*, (Morgan, 2013, Part 4); *Water Quality in Greene Declining*, (Dufalla, 2013); and *DEP Shelves More Stringent Water Test*, (Morgan, 2013, Part 1); all of which were published within one week in January. These were just a sampling of the articles addressing water issues that local newspapers published.

Respondents were passionate about the water in the Laurel Highlands, saying things such as “I feel a strong connection with the life-giving energy of water and so I just feel that through my whole heart and soul… I feel like protecting it is important.” The following exert from an interview illustrates what one resident feels about the community’s water supply:

> *I've been all over the world. [My partner] got me a book for my 50th birthday that had the 100 places in the world that should be seen in a lifetime. 100 most beautiful, sacred places and I've been to 33 of them… And I still say, where we live is one of the prettiest places in the world. We have the highest quality water. One percent of the world has the quality water we have. With the mountain stream water like this, it is such a world heritage and of course, as we go on in the interview, we know that's being threatened. So that's very upsetting. It's a hard thing to think that this 1% of the best water in the world could be ruined because of somebody's short-sighted greed. (Resident 2)*

This appreciation for the watershed is a reason why threats to it from industrialization were such a concern for residents. A female respondent stated “I have anxiety from time to time about it when I think about it [fracking]…I just worry about the water first, but then the ground being contaminated too, then the air.” One resident asked this question “What’s going wrong with the water and are there health effects that are associated with it?” Another female resident voiced her “main concern is what it’s going to do to our water supply… We use water for everything…So I have health concerns because of that.” Respondents discussed issues that have occurred in the watershed already, and how shale gas development may further impact it.

> *We have had water issues here for as long as the coal mining has been happening. It seems like this is a water rich area, and that’s a big draw with the Marcellus drilling, but the water is not all good. And even people*

who live here don't realize that. There are people in Normalville who don't even have water going to them. And that's from the coal. So now gas drilling is coming, taking the water, ruining what's left, and it's scary. It's a new threat to the community…. It boils down to the water… We need the water so much more than fuel from the Middle East and look what we pay for that! Can you imagine if it was water in that short supply? Maybe that's what they should do- charge these companies for the water as much as I pay for my diesel. (Resident 14)

I worry about water being contaminated. The amount of water that it takes to do hydraulic fracking, I worry about them using the water from natural sources and the wildlife suffering and people suffering from it…The worst of my fears would be that the land and water is polluted and that the beautiful spring water we have now is not available anymore. …When you live with spring water your whole life, it's just such a luxury… Material things aren't high priority in my life. These things are; things like clean spring water, so you can't really put a price on that. (Resident 7)

If you could apply a value to the water, it would bring about a more accurate measurement of the actual cost of the drilling. See we're not factoring in so many factors, like the value of the water. I don't understand how water gets to be the least valuable. The only thing we've been measuring in the last decade is the air quality. What about water quality? (Resident 10)

I am not that well educated on what can happen but I know that the chemicals that are released from the process can get into drinking water supply and we do have a well outside. I'm concerned about you know chemicals reaching into that and then us watering the plants and then eating them. (Resident 5)

In other areas of the country where they've done this, they've just completely destroyed the ground water. The Allegheny River, which again is a huge part of the tourism and the economy in the area, is one of the cleanest rivers in Pennsylvania and that can all change…My water comes from Mill Run Reservoir just like everybody else's… It's all connected and eventually things are going to get bad, the rivers are going to be dirty, the groundwater is going to be dirty, pollution. Our trees are going to die. It's all related. It's all connected. (Resident 3)

The ground water will be damaged… I'm not sure the potential damage to the land but definitely, if they're pushing chemicals to the ground to try to

> *extract the gas if there's any oil available, I believe that they will do irreparable damage to the ground water in the area… Absolutely. There is no way that you can pump chemicals into the earth and not damage the ground water in the earth. (Resident 6)*

> *My biggest concern is the abuse of water... My next one is that they say they do it safe but you can't see it so you don't know when [they] put the pipe down and they concrete it, that are they going to let it set? It is going to be set right? The ethical standards that they play, if they did it exactly right, the way they're supposed to, it could be safe. …What's way down in there eventually it's going to come back to haunt us... We need water and it will be abused so that's my biggest concern. (Resident 16)*

Worries about issues occurring with privately owned water supplies and not having access to clean drinking water were concerns reported in this work. A female resident stated that her "biggest concern is that I have well water. And I live in a part of Somerset County that is very unlikely to ever receive public water because of existing water quantity issues in this area." In this work, those who have private wells feel especially worried about threats to the water supply, because they do not feel that they will have access to a public supply, should something happen to their wells.

Throughout the interviews, the issue of "well water" versus "city water" was discussed by residents. Many people in rural communities are located in remote sections where a public water supply is not available for them to access. Instead, they rely on private wells accessed from ground water supplies found under their land. This water is not regulated by a city, township, or borough and is only monitored at the volition of individual. Homeowners are responsible for the safety of their water and ensuring its sanitation for their family. In the course of this research, it was found that nine participants had water from a public source and eleven participants' water was supplied

from wells. This factor was important as it affected perception of basic needs and level of control over one's environment.

Outside of the fears that people have about what may happen to the watershed in the future, residents discussed changes they have already seen since shale gas development began. These events are discussed in the following sections. Witnessing these occurrences has led to an increase in anxiety about current water supplies, as well as the future of their water, should these practices continue.

> *What I found out is if your water wasn't checked beforehand they have no leg to stand on if something happens to you water... It's where they actually compress the gas. That's the biggest pollutant over the lifetime of the well. It's not the initial fracking … except if it ruins your water or the fracking pond itself leaks as it did for XXX and ruined his water... He's getting water buffalos now. And I've spoken to many people who have had their water ruined. (Resident 2)*

> *Last week we had a thaw and I've been observant for thirty years way before this happened and stuff. There was some hideous brownish tint to the water even though the lake is drained. It still backs up everything. It could've just been mud and debris but it looked creepy. Late spring last year, some of the main stream going in was really a strange blue-grey... That would be my biggest health concern- the water. (Resident 1)*

> *They keep busting them dumping the used fracking water in streams and down storm drains. I have some buddies at work that are really into trout fishing. They said the little creek they fish on the other side of the mountain was so low last season that the fish we're dying. They said the fisherman's association they belong to went after Somerset for it. They said Somerset was selling the companies the water from the stream for fracking. And that they were taking so much that it dropped the water level to the point where the water was too hot for the trout or something… Mostly I'm concerned about the water, like the permanent damage to the watershed and rivers. (Resident 11)*

> *I think I have reasonable fears that they're going to poke a hole through one of these aquifers, that there is going to be some water effect. The*

other thing is too, is that, you know Pennsylvania was late off the start to control this - the wastewater… I've seen these guys dumping the water. I've seen them draw water out of Laurel Hill Creek which is just, as far as I'm concerned, that's a crime. You know, that's such a delicate watershed. For those guys to take water out of there I think is just wholly wrong…

More than anything else, [I] fear that the regulation won't be there on these companies because it hasn't been so far. I mean, state regulation has not shown an ability to prevent worst case scenarios, it hasn't. The Mon River is full of heavy metals and salts that they can't get rid of. There [are] still not enough personnel at the DEP to watch. (Resident 3)

The first two wells that they did in our community immediate had large frack spills; surface spills, which got into Tubmill creek and impacted it. So we have had all kinds of damage to our creek and our ecosystem from drilling from spills at these well sites, and we have no way of knowing if they are properly cleaned up.

So we have I think a very grave concern in my community. They have also turned my stream different colors. They have turned it red, they have turned it white, they have turned it grey with various chemical incidences and again this is one of the highest quality creeks in Western Pennsylvania. (Resident 8)

I think my biggest [concerns] would be um emissions, so air emissions and then water aquifer contamination. We know that almost 7% of wells in the commonwealth of Pennsylvania have these constructions that failed immediately really so that's a pathway up the well inside where aquifer from below and you know 7% of all wells, when you think about the full implementation of shale gas involvement in the area, um you know how many wells is that total and is it going to be the well next to my property? (Resident 4)

As discussed earlier in this work, hydraulic fracking falls under the Halliburton Loophole, making it exempt from certain regulations. Here, two residents discuss the lack of available information about the compounds used for fracking, and the chemicals they feel pollute the water supply:

My perspective about the drilling is the thing that bothers me the most about it is … I work in construction and frequently I work with different chemicals and a lot of the chemicals that are controlled in my industry,

> *industrial products like toluene and xylene … these are chemicals that are really restricted in the construction industry for a reason, because they're really toxic, and we have to very carefully label and store them to be disposed of in proper locations. And I know that the drilling industry uses it way more than we would use in construction… Even if they are held to the same restrictions as far as how they dispose them, they literally were leaching them into the ground, which could mix in with our fresh water, because it's a valuable resource in and of itself. (Resident 10)*

> *The fact that DEP wants to review the chemicals that gas companies are pumping into the earth but the gas companies are stating that those are all proprietary information. To me, that tells me that gas companies aren't really sure of what the chemical make-up is of what they're pumping into the earth. It's a case to case basis, and sometimes they pump in a little more of this chemical or that chemical in order to extract the gas. I don't think that the fracking process has been as scientifically refined so that they actually know what they're doing. I think it's more of a try this, try that, more than anything. I don't think that they really know what they're doing. If they did, they would be more forthright in providing information to DEP. (Resident 6)*

When a resident was asked about future plans if there are issues with his water supply he replied, "We have a shallow well. I have a deep well that was not tapped into. I dug the deep well when we knew that this gas was going to happen…" This resident also states that:

> *Thirty years from now, across the lake, there'll probably be twenty or thirty houses there where the gas well is. Once you have that population base, I have heard something, which is encouraging about. The plans are in the works of bringing water -- about sewage, but water at least from Ligonier, you know, which would be a big deal. (Resident 1)*

Even with the possibility of a public water source, there are still fears about what the future may bring to water supplies. A resident summed up her feelings by saying, "There is no way that is good for water. I'm terrified that it's going to affect the water… that it's going to make water undrinkable."

As illustrated by the comments above, the future of the watershed in the Laurel Highlands is presenting concerns for residents. They are expressing fears about water and report increasing anxiety and worries about their health, safety and that of their families. Residents are witnessing issues occurring with the water supplies at this early stage of shale gas development, and are worried the problems will increase in the future. The fear of contamination of a basic resource is having a major impact of the quality lives of Laurel Highlands residents.

Anxiety due to air quality. Residents also voiced concerns about the impacts that shale gas development is having on their air quality. One stated "Air quality. I mean there are chemicals [associated with fracking] and even diesel from the trucks." Another resident worried "It's going to start making people, animals, children ill because …Not only is it in the water, now it's in the air." Air effects occur not only from the fracking process itself, but from compressor stations, which are needed to pressurize the gas for pipeline transport. The following are excerpts from interviews in which residents discuss anxiety about air emissions.

> *There's a compressor station there that's it's on the right hand side going east. They didn't put it down here in the valley. They put it up high. They put it next to the turnpike so there'd be less chance that they'll be cited for pollution. And that's the scariest part though. That's where there'll be constant emissions from that, as opposed to this periodical drilling and fracking and so on. (Resident 2)*

> *National Geographic did a big interview; her family became very sick after compressor station went up near their home. [She and] her husband had to move out of her house, so all of these people that are involved – they literally had to leave their homes, because they were just too sick…There was a very toxic release of chemicals. All of those things*

> *provide massive amounts of pollution, and we already do not have wonderful air quality in Westmoreland County. It has significantly deteriorated our air… There's a permit for an expansion of the compressor plant… You're talking about tons – hundreds of tons of carbon monoxide- all that contributes to ozone. We already have an ozone problem, so for people who care about health and that's a priority - a lot of people are very stressed. (Resident 4)*
>
> *Compressor stations also are permitted to emit certain tonnage of toxic emissions and the biggest issue with compressor stations and dehydration metering stations, Shale gas or natural gas in general is that when they are permitted our state and federal government doesn't aggregate them.*
>
> *So it doesn't add up the total toxic load for a given region, whether that is a township, or a watershed, or a valley that is a place that is downwind from a bunch of facilities. They're only looking at individual sources of emissions and the total toxic load so that is a huge concern. (Resident 20)*

In this research, anxiety about air quality reduction from blow off from the drilling process and compressor stations were issues, especially with those who have had the most exposure to shale gas development. Residents worry that they will have lowered air quality which will lead to health issues. They are also concerned that despite their proximity to gas wells and fracking sites, the addition of compressor stations in their communities will cause negative impacts to the air quality. Worries about another basic need – the air- is negatively impacting the lives of those in the Laurel Highlands.

Anxiety due to wildlife and vegetation impacts. Tied to the air and water quality, residents interviewed were concerned about the environment and wildlife in general, voicing statements such as "I have some concerns about it being so close and what it might do to our water supply and what it might do to the wildlife environment around." A female resident stated that she is concerned "about what it's going to do to the

environment in general… There [are] a lot of people that farm in the area and a lot of the foods that we eat in the summertime are from the locals." A local newspaper report confirms negative impacts on animals and farming in Pennsylvania counties outside of the Laurel Highlands in the article *Shale Gas Development Threatens Dairy Industry*, (Kenarov, 2013).

A female resident interviewed stated that she feels "concerned about animal health as well. We've ruined so much of their environment. The fish, the animals who drink from the streams- they don't have access to city [water] and clean water." A male respondent reports witnessing impacts to wildlife even at this early stage of shale gas development in the area:

> *We've seen a lot of bad impacts from that. My stream is full of silt… Basically they just dumped so much sediment and we had a very rare salamander that lives in the Tubmill watersheds called the Easter Hellbender Salamander …That is a big salamander and every year the Pittsburgh Zoo and Western Pennsylvania Conservancy would do a Hellbender count in our stream and like I said after the drilling operations commenced last count hellbenders 2/3 of them were gone. They require extreme water quality. They are sort of like a canary in the coal mine. (Resident 8).*

Reports from residents about wildlife tie in with vegetation concerns linked to the water supply. Review of interviews indicated that Laurel Highlands' residents strongly feel that the purity of the water is tied to not only their health, but the health of vegetation, animals and the land. Anxiety about what may happened to the wildlife they value and the food they eat is making some question the safety of the practices involved in shale gas development.

Anxiety about earthquakes. Residents are concerned about more environmental impacts as a result of shale gas development, and one of these things is an unusual occurrence for Pennsylvania- earthquakes. These quakes are caused from disposal of the water used for fracking (Chol, 2013). This anxiety is a new concern for residents, many of whom have never considered earthquakes a threat that could occur in the Laurel Highlands. Again, local newspapers addressed similar issues as residents. The *Herald-Standard* released this article in January: *Earthquake Insurance Covers Fracking*, (Morgan, 2013a), indicating that fear of earthquakes is another community change Laurel Highlands' residents are experiencing.

> *The other thing that happened, it happened within a matter of months of me moving to home was that earthquake that occurred. That they believe is a result of the hydraulic fracturing that is happening. I mean never in my life would I ever hear of an earthquake in Southwestern Pennsylvania and nobody had… (Resident 18)*

> *I think its hydrochloride... it's a pretty controlled substance. It's in a lot of industrial solvents and chemical strippers, which I believe the drilling industry is using to dissolve the bedrock by mixing it with the water, and they weaken the rock that way, and then they blast it with water pressure, and it opens up the rock, which would be lovely, if it didn't leave you high waste, and possibly change the structure of the already kind of shaky hollow under Pennsylvania, mined-out land… (Resident 10)*

> *It sounds crazy but I'm worried about earthquakes…Well there was one here last year. There have been a bunch in Ohio and a few up in New York. I guess there are a lot of inactive fault lines on the East Coast. I read that they think the fracking could potentially be causing these things. I mean if you start blasting miles down into the Earth something bad is bound to happen. Mostly because of our infrastructure here, the water lines around here rupture at the drop of a hat on a good day. Combine that with the century old structures here- we're just not prepared for an event like that. A medium sized quake, like a three or a four, would topple houses and completely disrupt all of our utilities around here. (Resident 11)*

The issues discussed in this section make up the primary theme uncovered in this work, which is the anxiety Laurel Highland's residents have due to worries about the environmental impacts of shale gas development. Anxiety about impacts to water and air quality leading to polluted environments, changes in wildlife and vegetation, and even earthquakes are concerns for residents. Daily worry about losing basic resources was listed as a major concern for Laurel Highlands' residents. These daily anxieties are leading to a reduction in quality of life due to shale gas development.

Key theme 2: Anger about outsourcing of natural resources. An issue that was a concern for seven of the 20 participants was the outsourcing of the natural gas obtained from shale gas development. In terms of demographics with this response, four men and three women expressed feelings of anger. One male was an industry worker.

In the Laurel Highlands, there is no infrastructure to support utilizing the gas contained in the Marcellus Shale. This makes the drilling a difficult pill for some to swallow, as they are burdened by the process and industry of drilling, but are unable to reap the benefits of its energy and are not presented with a low cost alternative to their current fuel. One resident put it this way, "You know it's irritating that this gas may have been sold to Europe or South America and we can't get it because we don't have the population base just to fly [in] the piping, the infrastructure…" A male resident said, "I'd like to see exactly what money communities are getting from drilling and how it is being

used. I also wish I could get the gas here." Another resident spoke about the unfairness he feels in the current situation:

> *The first thing I would like to see if this industry is to keep operating is for it to not pollute the water and pollute the air and if it has to spend a fair amount of money to achieve these goals that is fine, that is part of the cost of the extraction of this industry, but it is totally unfair for them to extract industry in Pennsylvania sell it to China, sell it to India and make the Pennsylvania residents pay the costs in public health, public air and public water. (Resident 8)*

Discussion of outsourcing continued with residents feeling anger and frustration about not reaping any benefits from the natural resource extraction in the Laurel Highlands. Residents were angry regardless of whether or not they leased their gas and oil rights. Some respondents linked what is happening with shale gas to the Laurel Highlands history of coal production, which was (and is still being) outsourced as well. Residents discussed how they felt the outsourcing negatively impacts Pennsylvania's economy. The following are excerpts from resident interviews. These responses suggest that this theme is still emerging in their consciousness of what the impact is to all of the industry.

> *We don't get any of it. It's been piped to the East Coast and put on tankers, liquefied, and sold abroad. So you know the commercial with that blonde bitch walking around in her black suit talking about America's energy independence? What the hell does that mean? We're not getting any of it! I would like to think maybe, not in my life -- in the future, we'll probably have gas here and it will be great. (Resident 1)*

> *We're not getting any kind of gas. It's going somewhere else. We're seeing nothing from it which that's probably the thing that angers me the most. It's frustrating that we have to live with heavy industry but we see none of the benefit. (Resident 2)*

Regulations, safety for the people and the earth. And for God's sake- gas here if we have to put up with this shit. I can't get gas at my house. It all goes out. Just like the coal. The coal fuels China and this gas… Who knows? Major east coast cities- that's if we are lucky. It will probably go to China, too. We are going through all of this and no one is getting the gas. At least we can burn the coal if they would leave it here. (Resident 14)

I don't understand why they have to ship the gas away from Pennsylvania. What's up with these pipelines? Why can't we produce the power of Pennsylvania? I don't understand why that power can't be for people in Pennsylvania. And if it's under their land, just like water, why does that gas not power their own homes? Can't we power Pennsylvania with the gas instead of sending it all over the country? And then industry will be attracted to Pennsylvania because industry will want cheap energy. It would save a lot of money. I just think that the energy should stay there. My interest is more in the Highlands of Pennsylvania than it is in the economy of surrounding areas. Whatever resources are in an area should kind of stay there so they can continue to nurture that area instead of spending colossal amounts of energy shipping them all over the planet. (Resident 10)

The most interesting thing to me is that we have no natural gas pipe lines so I cannot heat my house or heat my water, my potable water with gas but there's all this natural gas. To my knowledge, there are no natural gas lines available to any of the residents in the area. …There's no natural gas pipeline. The only natural gas we could get is if we would put in our own pipeline. If our well was next door to us, a hundred yards from us, and we would be able to pump into that, we could get natural gas that would benefit us but that's not going to happen. And, that's not going to happen to anybody in this area. They're more concerned about getting a natural gas pipe line to store the gas to sell to other people than to provide the resource to the public for their own use to reduce their energy cost. Everybody in this area is burning oil, propane, and wood, or coal. (Resident 6)

One of the things that floored us the most about all of this well how sad we don't get the gas. So us folks around here, Mr. XX is over 60, I'm pushing 60, we're burning firewood. That's a lot of work. Boy it would be sweet if we could get that gas. There's no option for that at this point. Now, Mr. XX said, I think he said for like $10,000 dollars he could have the pipe laid and he could have had gas into his house

> *Well the contract was if it was a shallow well, if they found gas in a shallow well, we would get free gas. Ok. But a deep well, no. And again, because of the cost of the piping. A deep well, has to be compressed typically because it's coming too fast, the pressure is too hard, you couldn't just pipe it into a house. It has to go to the compression station and then back out. And there isn't that kind of population that would warrant that, that would warrant them putting that much money into it for the little bit of dollars they would get back from it. There's just not enough population.*
>
> *It's [the gas] going east to Baltimore and probably to the northeast. But, there was a lot of talk about it being sold overseas because they're gonna get a lot more money for it overseas. So whether or not it is going to the northeast or if it's going to Europe or somewhere else I don't know. Those kind of things are really hard to find out. (Resident 2)*

These statements demonstrate reasons that Laurel Highland's residents are feeling anger about their situation. They are experiencing anxiety from fears about environmental contamination, which is occurring from an extraction process for a fuel they are unable to use. This has occurred historically in the area with coal, but the coal was a viable option for residents to use, if it was left to be sold in the area. There is no infrastructure in the Laurel Highlands to transport the shale gas to people who live in the area. This means that even if a resident's property is home to a large supply of shale gas, the owner will not be able to use it to heat or cool their home, or power their vehicle. Feelings of anxiety from the environmental impacts and anger from outsourcing are leading to another theme which surfaced in this work, loss of power and reduced sense of control.

Key theme 3: Loss of power and sense of control. The changes occurring due to shale gas development in the Laurel Highlands have led to feelings of powerlessness and a loss of control for nine of the twenty people interviewed. Two male and seven female

respondents voiced this concern. A resident who worked as a land man talked about battling a huge gas and oil company, “Oh my God! Right now the industry that is going to have the most shares is Chevron. They have the most acreage. So do you think you could fight Chevron?” This same resident addressed her concerns about a loss of control:

> *I'm just surviving like everyone else. I don't want to sign because if I do sign, I just, I feel like I just signed over with the Devil because they’ll have control…. And then I don't have a control over it… It will be tough. I’m a single woman. They’re a huge corporation. (Resident 16)*

Residents discussed feeling a lack of respect from the industry and fears from not knowing what is going to happen as a result of shale gas development. Themes of loss of control from industrial threats surfaced in this work. Participants continued to reference their plight of not feeling empowered to fight gas companies in the following statements:

> *You feel like a 3rd class citizen in that we're not given much respect in terms of how this is gonna impact us. It’s happening and that's that. That's kind of the attitude that they take. That's the hardest part about it, not knowing how bad it might get, not knowing when they're coming back, not knowing if the water is going to get ruined. (Resident 2)*

> *There has always been a threat from industry. But this seems scarier. I think because there is less control with this. There was never much control with the coal industry, but there’s even less with gas. Even if you do own your mineral rights they can frack under your land and you wouldn’t know. And there just seems to be less ability to control things- like where they get the water to do it and what they do with the water after. Air pollution is also a concern and there is no way to say where a compressor station could go up. (Resident 14)*

> *A lot of my concern is how this development will happen with my neighbors and the fact that we have no control over it and that the state had just ruled over for the gas industry as willing to let them do anything they want to do; has not fined them, has not set up reasonable guidelines*

and regulations for this industry, has not controlled the waste water, the high pollutant water. (Resident 8)

There could be some conscientiousness developing here where -- but it just amazes me. This is so in your face. A lot of these pads are very innocuous places and the early gas rush boomed on in Texas. Those wells are at the middle of nowhere. Here, more heavily impacted. (Resident 1)

Respondents talked about their feelings of lack of power and control leading to a sense of exploitation and fear. Even industry insiders interviewed for this work talk about a lack of trust leading to feelings of fear from the huge corporate influence. Examples of statements about this topic include:

I don't feel like I have any control and that's what ultimately it troubles me. It is something that worries me because I don't feel like I have any control and I feel like sort of exploited. I just feel like if anything were to happen, the worst of my fears were to come true; I don't feel like we would have any power. (Resident 7)

I think by the time we realize the impact this industry has had on our infrastructure it'll be too late. Like I guess each county or township gets residuals from the industry. But they're spending on everything but improving bridges or highways that already at the breaking point. It just feels like we're being exploited. (Resident 11)

I don't really mind other people coming in to the community and working. That's diversity. That's great. I think it's just the practice and I can't trust them. I think that's what scares me and I don't have the money to fight them. And they have all the money so that's it. (Resident 16)

Reasons for feeling less power and control varied. Not owning one's gas, oil and mineral rights affected sense of control, "because it means I have no control over the surface." The feeling that one's gas may be taken from them despite not having leased is a concern for some people, as they cannot actually see what is occurring with horizontal drilling. Respondents voiced feelings of violation from what is occurring as large

corporations come into the Laurel Highlands to develop the area. Residents are upset with regulation gaps which do not hold gas and oil companies to the same standards as other companies. There was discussion of a feeling of helplessness because of legislation, as residents felt that the power of the people was being stripped away from community by bigger government.

> *People have a greater sense of helplessness…Our state's latest attempt at an oil and gas act, a piece of regulation is Act 13, which gives the state preemption over local municipalities who might wish to zone these operations into industrial areas and out of residential ones… The state is telling us, and the industry is telling us they don't want us to make these decisions by ourselves. They want to be the ones to make the decisions so definitely with regard to this industry specifically people feel more helpless. They feel like their rights are being taken away and they really don't know what to do about it. (Resident 4)*

> *If they want your gas they are getting your gas. How do I know they aren't fracking under me? If Jo Schmo Neighbor signs, guess what? They are getting my gas and I'm not getting anything money wise. That's a pressure faced a lot. If you don't sign, they are getting it anyways, so why not sign? This industry is smart that way. (Resident 14)*

> *It's been around for a long time and they [gas and oil industry] have a lot of political influence in this area but there are a lot of people, my neighbors, who I would have thought would have been gung-ho, who were furious that these type of testing crews were coming on their property without permission. That they were just walking around here like they owned the joint and I think a lot of people felt pretty violated after all of that took place. (Resident 12)*

Both those employed in the industry and those who were not agreed that having money helped with influence, power and control. One resident reported feeling that "Money rules everything around me. It's hard to influence people when you have other

people influencing people with money." A resident summed up her feelings about where she feels power comes from within the community and industry:

> *You are either living off of [the land] or you embrace it and want to play on it. So there is a sense of protection. So I find that the community wants to protect it. You know, it's 2013. Since 2008 a lot of things have happened [with shale gas development in the community]… So the best thing is to keep educating them and making them aware because they say that knowledge is power. And I'll tell you what - all they have to do is not sign and they have ... That's the power. (Resident 16)*

As illustrated above, shale gas development has changed power dynamics within the Laurel Highlands. It has affected residents' perceptions of control in their lives and communities. Residents feel that the money gas and oil companies possess gives them power over both the individual and the community. Respondents also feel that government is giving the corporations more power with legislation geared to protect the big business, not the individual. This lack of control in their own lives and communities is combining with anxiety and leading to negative quality of life impacts.

Key theme 4: Quality of life reduction due to industrialization. Beginning with the first conversation undertaken for this work, participants discussed perceiving their idyllic rural community transitioning to industrialized towns. Through the course of this research, 14 of the 20 participants expressed concerns about negative quality of life impacts due to industrialization of the rural landscape. Four males and ten females listed this as a concern. The three industry workers interviewed felt their quality of life improved, and three other respondents did not discuss quality of life impacts.

Concerns discussed included daily nuisances, such as, “I want to hike in clean air and mountains with trees. Not by an industrial site.” This theme continued to surface in other references to industrialization such as, “It [the gas well] smelled like a heavy industry area, like you were in the city in the middle of the steel mill.” Another participant who is familiar with the steel mills from living in Pittsburgh in the past reports “I grew up in industrial Pittsburgh and so it’s like the industry eventually followed me out here, but it’s not steel mills.”

A resident talked about the negative impacts he is feeling as a result of continued drilling in the vicinity of his home stating that “The other big thing…is the natural beauty. It’s going on for three years now, but the well has been dug and everything. They never even planted grass on our ninety-acre fish lake here.” Respondents discussed leaving more urban environments to live a rural lifestyle in the Laurel Highlands, only to watch that peaceful landscape change due to fracking and shale gas development occurring across from their homes.

> *We escaped from the city to get away from heavy industry and now heavy industry is in our backyard… When we put all our eggs in one basket, so to speak, when everything we have we've invested in this place, it's quite shocking to see heavy industry in our backyard. (Resident 2)*

> *These wells are extremely noisy, they are extremely big industrial projects and they will exist on-site for 60, 70, 80 years, so I have great concerns about my beautiful rural countryside being turned into an industrial zone and as far as the gas drillers operating with any kind of care for the environment as I have seen personally they don’t care at all. (Resident 8)*

Residents spoke about witnessing industrial changes to the landscape, as well as stress experienced due to the industrialization. This stress is caused by visual changes,

noise, pollution, increases in traffic and anxiety about the environment and health effects. Respondents discussed feelings of uncertainty about what is occurring in their community which in turn is leading to anxiety. The following statements are the responses of residents when asked about their perception of their community when shale gas development occurring:

> *The sites I've seen, they are a mess. Clear cut, leveled, industrial looking. And so big. This area is so beautiful. That's its draw. The nature and beauty. And setting a big industrial site- or hundreds of them- across it, that's a concern. And then the companies leaving. It's what happened and still is with coal. You live with no water, and your land screwed up and you are no richer. (Resident 14)*

> *We wanted to be in this area because we thought it was cleaner and healthier and better for our children….The people who are most stressed is the closer you live to those wells, because like the XXX's who live up [the road], they are so stressed because they had no idea the well was drilled, they leased, they didn't know it was going to mean truck traffic, lights-on 24/7, they couldn't sleep because of the noise, they had to move their bedroom, they ended up with some health issues, the pond was polluted… (Resident 4)*

> *It's just still something that I'm just so uncertain about, so I guess it scares me because I don't think the people who are supposed to know, really know either. I just have anxiety, because I feel like it's just fueled by greed and not a real concern about the welfare of people involved and the environment and wildlife. (Resident 17)*

> *The stress levels higher just in the constant – at the township level, having to fight for community rights, having to fight to preserve zoning. All the things that we had, all of a sudden the gas industry came in… So the stress of fighting that for everybody that I know who's been involved, and I get e-mails from like literally hundreds of people – the stress level was very high.*
>
> *I get e-mails from people, "Oh my God, they're flaring again. The smell is so horrible," [or] "You know I'm having an asthma attack, there's nothing I can do," – to the person who just says, "I'm so tired of meetings, I want to do other things with my life, and we're still fighting zoning," and*

… it's been stressful for – too much everybody involved at every level. (Resident 4)

It just makes [you] question the quality of the air you are breathing and the water you are drinking and of course there is the increased truck traffic, which can be unnerving especially if you have kids that walk to school or ride a bus to school. It adds a certain level of stress I guess to put it simply. (Resident 20)

We have also seen some very negative human impacts in our community. People who have had to live near well development. I have a friend who is a retired WWII Veteran and basically the land man lied to him and told him that it would be in a different location- the well- if he would just sign over his 20 acres and when he did they located the well 200-ft from his house and it has basically been a nightmare for him. Months of drilling, months of fracking, then months of drilling a second well, months of fracking, incredible amounts of noise. He and his wife had to cut out Styrofoam and put it in their windows and sleep with a white noise machine… When they flared the well, he had to move out because the noise was like a jet engine. I went out to see what it was like and stood on a public road; on Ross Mountain road and you could just feel the heat from the flare and you could feel the ashes falling from you. These are all full of toxic hydrocarbons and it is done right next to this gentleman's house…

It has definitely been impacted negatively. I would much rather [not lease for drilling] even though it may mean several millions of dollars to me in the future that pales in comparison to all the stress that this is causing me about the environment in my area. You can't put a price on that. I'd say if anything it has been a very stressful development in our community. I think for almost all residents except for a few large land owners that have benefitted but most people are not seeing any benefits they are seeing the stress. (Resident 8)

I think it's environmentally it's terrible, it's ugly… I mean that's part of the draw here, is the natural beauty. That's what we're selling. But I worked at a YMCA camp from 2007 until 2011, and it's in a very out of the way area, and they were actually trying to drill there, and because the camp did not own the mineral rights [they did not drill]… I just found it amazing that nobody thought there was an issue with bringing these children to learn about nature and 30 feet away from them there is this huge, ugly, pumping loud, eye sores. (Resident 19)

> *The stress from it. When I hike, I can see strip mine sites. Big pipeline scars across the land. I can see smoke stacks from power plants. I'm waiting for huge fracking space ships – because that's what they look like- to pop up. Not to mention changes in the people moving here. Would you move here to ski if it is an industrial waste land? Huge, lights at night, other worldly. Not in a good way. The land is flattened and trees gone. Trucks sitting… It's horrible. (Resident 14)*

> *Personally, my recreational activities have changed…. One reason that I really enjoy living here is that I can roll out of my driveway on my road bike and ride sixty miles and pass probably six cars and ride through some of the most scenic landscapes in Southwestern Pennsylvania, and now I can tell you that my husband and I tailor the routes that we ride and the roads that we take, based on gas extraction and truck traffic.*
>
> *I think it left a lot of us who own small parcels of land that were carved out of farms a hundred years ago and who have well water, they're pretty vulnerable. I think that has been frustrating. There's just an edginess…My personal concerns are water contamination and disruption of my quality of life… (Resident 12)*

Review of local papers support resident reports of quality of life impacts. The sheer volume of articles reporting impacts of shale gas development is one indication of change. In February 2013, *The Herald-Standard* published over 25 articles pertaining to shale gas development. Reports in January of that same year ranged from disputes between residents gas companies over rights (Kelly, 2013b), to residents in these same areas suffering severe health effects (Morgan, 2013b).

Negative changes in day to day living, such as increased truck traffic, leveled treeless fracking sites, and increase in noise, are combining with environmental impacts, including water quality issues, air pollution threats, and anger about outsourcing of shale gas. The combination of these factors is negatively impacting the quality of life Laurel Highlands' residents have come to expect from their community. This reduced quality of

life is making some question investing in their community and remaining in the area long term, which is the fifth theme found in this research: resident sustainability.

Key theme 5: Resident sustainability. Shale gas development in the Laurel Highlands has changed residents' perceptions of their community by influencing nine of the 20 respondents' decisions to stay in the area. Three male and six females reported that development was a factor in long term residency. Stated bluntly, "That's [the gas drilling] affected my desire to continue to restore this hundred-year-old house." When a respondent was asked about moving from the area due to gas drilling the resident replied, "I hate to say it but yes. This is where I want to be, where I chose to be, but I don't know; maybe I wouldn't, even though I love it here." One female resident is reconsidering long term residency in the Laurel Highlands after her child is finished with school by debating, "My husband and I have had conversations about what we're going to do, because we're not going to stay here… If this area is so different from how it was when we moved here." Another resident discussed concerns about her family property in the Laurel Highlands and the value of it in the future:

> *I'm afraid that it's going to affect my parents' home and basically make their property worthless and make the water undrinkable. That scares the crap out of me… because that land most likely is going to become mine. ..After she passes away and the idea that that land could become worthless? (Resident 18)*

With much of the Laurel Highland's economy based on tourism, industrialization is a concern voiced by residents. Here, one female resident discussed how the local ski resorts and the part time homeowners there may be affected. She continues to talk about

the ways that shale gas development is changing the views of both herself and people she knows who came to the Laurel Highlands for the environment and what it has to offer:

> *A lot of these newcomers that have moved into this area to take advantage of recreational opportunities, and I would include myself in that category, will not tolerate this kind of development. These are people who love this area, some of whom have been here for twenty, thirty years, who looked at me and said, "I won't stay. I'll sell my house, I'll move to, you know, Tennessee, I'll move to the mountains of North Carolina, I'll move to New York, but I will not stay here to have my quality of life disrupted."*
>
> *Without Seven Springs we wouldn't have anything in that school district. It's so small, it's so rural and it's those second home owners and their tax dollars that keep our school district going… Almost fifty percent of the homes in that township are second homes… If all of these second homeowners, and people who have moved into this area to take advantage of recreation and quality of life, and rural living decide to leave, the result of what they see, what they perceive of a decline in their quality of life because of gas drilling, I think that ultimately we may end up having a negative effect on the economy in this area regardless of whatever short term spike we get from gas drilling. (Resident 12)*

Themes of a change in desire to invest in a future in the Laurel Highlands were reported by respondents, with some residents voicing concerns about shale gas development being a consideration when investing in their homes and community. Residents cite industrialization as a factor in long term decision making: "It does definitely. I mean we never anticipated having heavy industry 500 feet away from us. That was a huge blow. We spent years building this place as a sanctuary." Asked what would have to occur to get her to move, a female resident replied, "Ruined landscape and no water. When I can't walk outside my door peacefully and walk. And if I didn't feel safe."

Shale gas development is also causing some residents to question developing their family property in the area. There were also concerns about the industry affecting the

environment, which in turn affects the future economic stability of the Laurel Highlands. The following comments were part of the discussion:

> *There is no cradle the grave records of that [industry regulations and gas oil rights] and what this does it makes you very wary about investing in a community. My wife and I are in big farming auto project and we are still very worried about whether it was the right thing to do. Is our community going to end up being a ruined community and that we are putting money in a place where we will never get it out when they turn it all into an industrial site? It is very sad and it is very worrisome. (Resident 8)*

> *I'm disappointed that it's happening in an area where I sought refuge. And now this is happening and I'm putting a lot of money and time and energy into my home here. And it's very disappointing and potentially it could also be a financial concern down the road, because my value of my house may decrease. (Resident 17)*

> *I would like to [come back to Pennsylvania]. I hope that my water is still there. That was the main reason why I wanted to keep that property, for the water. Currently I'm living in California for work, and people here fight over water constantly. It's a very, very precious resource. I can see a time in the future, absolutely, whenever water becomes more scarce, people fighting over it… I would have liked to have property with water on it, so that I can use it for whatever I plan on doing… (Resident 10)*

> *The major thing about it is that it's going to destroy really the only thing that we have to sell to the world, and that the clean water, the clean air, the natural beauty, and that is whether people think of it or not, is going to affect everybody. From people who work directly at Seven Springs or at one of the river outfitters to the mechanic up the road that doesn't have business anymore because nobody can afford to buy cars. People don't look at it like that, and that's the most disturbing thing of all…(Resident 19)*

Some residents are looking for ways to remain in the area, despite possible negative future effects, reporting "I have so many friends and family here and I don't see them really moving, so, and I do like it here too. I could see living here permanently at some point in my life." A male resident responded, "I love the area, I love the location, so

I'm kind of looking at okay, what do I need to do to prepare myself so that this doesn't impact me?"

This research indicates residents of the Laurel Highlands feel impending change in their community which will take them from a rural community to industrialized town. There is a feeling of loss of control happening simultaneously. These changes, combined with anxiety about environmental issues, are affecting residents' decisions to invest in their community and remain in the Laurel Highlands long term.

Subtheme: Community Action

This work uncovered ways that residents are dealing with the influx of industry and their perceived loss of control. They are doing this through improved community action, which in some cases is leading to improved connection with other residents of Laurel Highlands and beyond. The increase in action and connection is a change discussed by respondents, with residents reporting feeling an increase in personal responsibility for the future of their community. A male resident discussed how he is looking out for his community:

> *I do feel a responsibility to keep an eye on them and I do feel a responsibility to know where these rigs are and what's going on…Do we need the energy? The only reason we need the energy is because we fail to develop renewable resources but the bottom line is that stuff's coming out of the ground. So, it makes no sense to oppose it. They [the community] should have a watchful eye. They should make these companies realize that they ultimately have to answer their communities… Obviously any extracted resource, there's going to be the BP oil spills, there [are] going to be the pipeline fractures. If the whole community fights it totally you wind up with these mining companies running amok because they own the government. They're going to get the rules and regulations on their own. One the same hand too, if you jump in bed with them, they're going to do it*

on the cheap. So, you can't police these guys from either side of the spectrum. The only way you can police them and keep them honest is right down the middle. I think this community at present is fairly polarized. I don't think they've really found a way to work with these extractive industries in a fashion that keeps them honest and also keeps them with a heartfelt or real responsibility to the community. (Resident 3)

Residents also felt that local organizations are helping them and their communities take a more active stance. Respondents cite the local watershed association and conservancy as the community's biggest allies. Community organizers also feel that residents have been stepping up to deal with the community loss of control. These topics are discussed in the following section:

I have no faith that the state is going to keep these guys in line, none, zero, nada and I think it's going to be absolutely up to landowners, watershed association, the nature conservancy to keep these guys honest. I don't have any faith in the DEP to take care of this. And with the Halliburton exclusion the EPA is pretty much staying out of this for now. (Resident 3)

I do feel that as a group collectively all of the speaking, that it has raised awareness… I think we've made a difference. I think everybody's really just put a hundred percent into this. I mean it's unbelievable when the legislation was up on Act 13, we had legislators tell us that the night that vote went up…We almost won that vote. We lost about like six votes, we worked – but we had thousands of phone calls registered that night. I mean people just work their hearts out… they're doing it all over the county. They're sitting and spending five and six hours researching so that they can present to the EPA what their concern about air. I mean, there's really an amazing effort being put forth by a lot of people so I think it's made a difference…

It's the only good part of the whole thing; you have an instant connection. They care about the same things you care about, their priorities are your priorities, despite the fact that everybody could make a lot of money if they would lease, they have a different way of thinking about lifestyle and what they value, and their families, there's just a real connection there. .. I've made incredible friends that I know I have for the rest of my life. (Resident 4)

> *I feel like the organization that I work for, which is a volunteer service,…We have a tremendous impact on the communities where we work. I think we really serve as a resource for people. Think we've done a lot to protect water quality and communities and the environment from harmful impacts of all sorts of extraction, you know, stone quarries and coal mines and shale gas wells…*
>
> *I feel like we have kind of taken a back seat position to playing an active role in our local communities. So we kind of just vote once a year and let whatever happens happen. We only really get active or interested if something comes in that might harm us rather than being more proactive and being involved and going to municipal meetings, and just being a more involved citizen in general. I think that one actual positive is that this is kind of waking people up and making them realize that they do have a responsibility to protect themselves… I think that people are kind of realizing that they need to be more involved. (Resident 20)*

The improved connection and involvement is helping residents adapt to the changes occurring in their community. Another way residents are reacting to change from shale gas development is by becoming more energy independent. Two respondents report that they are taking matters into their own hands when it comes to their needs. One reports he will begin rainwater harvesting, in case of contamination of his personal well water supply. The other resident states that "We are going to put solar panels on my barn roof and I am covering my roof with real renewable energy, sustainable energy." Follow up conversation with *Resident 8* confirms that he did indeed convert his farm to solar energy.

Industry Workers

The perception of change from shale gas development was different for industry workers. Two workers sampled felt that the drilling process works to ensure the safety of the water supply through industry safeguards and standards. A gas well driller mentioned

the steel and cement casings that are used so that gas does not migrate into freshwater aquaphors. However, the same participant did discuss concerns regarding other areas of the process, specifically the wastewater that is produced at a fracking site, and its disposal, citing that the regulation needs to continue when the wastewater leaves the fracking site. This is something the driller noted the drilling company is not responsible for.

Those working in the natural gas industry also identified health concerns specific to them. Here is what one worker states are concerns when dealing with chemicals he uses on a daily basis:

> *No, I don't feel safe. What is really in it [fracking fluid]? I mean sure you have the MSDS but—the Material Safety Data Sheet but when do you really get to review it? And it's not broke down for an eight-year-old… The oil-based mud material your body -I guess your skin builds up a little touch exterior. It gives you somewhat of a rash and irritation. …I keep that stuff off of me too. I find I bring it home under my fingernails. (Resident 9)*

Two respondents working the industry are experiencing quality of life improvement, the opposite of what other Laurel Highland's residents report. One states "I'm making what some doctors are making and I'm not educated … working 13 years in a factory I've already made far more money working three years on an oil rig than I did in 13 years in a factory." A Laurel Highland's resident who works for the pipeline also spoke about positive quality of life impacts by saying "As far as quality of life, mine has definitely improved with the industry. My pay has gone up and I can buy what I need. So

yeah, it has improved." This same resident also stated feeling of more of an influence on the community after employment with a shale gas development corporation:

> *Working in the industry and supporting the community with the money from it feels like an influence. Money has an influence and spending it can change things. And my company has an influence in the same way. They bring money to the community by bringing workers, either from the area or not, into the community to spend their pay and live here. (Resident 15)*

These statements were included in this work in order to show a section of different perceptions some residents in the Laurel Highland have regarding shale gas development.

Reflective Person

In this work it was proposed to utilize a second coder to strengthen the work. Due to limitations in availability of a second coder, a reflective person was utilized instead to help generalize themes from the respondents. The reflective person emphasized the importance of a few themes such as money, water, environmental issues, and loss of control. The person chose "environmental concerns" and "perceived loss of power in their community" as primary themes. The overall reflective person's assessment was that the interviewees' opinions were "not surprising for the most part," and he "believes their responses would remain the same in any scenario involving any perceived change in the community." The reflective person also stated that the loss of control was the trait he felt was the most salient from many of the interviews.

The reflective person noted specifics about each interview. For instance, he felt that one interview "embodied the theme of money…that the interviewee kept bringing his

responses back to money, either gained by others or opportunities lost to him." The reflective person expressed surprise, in that the interview responses were in line with his preconceived ideas of what each participant would say. The reviewed stated that only the sixth interview was unexpected, as he "believed he [*Resident 5*] would lean towards a pro drilling side, being less concerned with the environment and socioeconomic effects," than what the interview reflected.

The reflective person expressed doubt prior to the interviews, believing that it would be difficult for the interviews to unbiased. The reviewer thought the persons interviewed, knowing in advance the topic of the reason they were being interviewed, would tailor their responses to a more "anti-fracking" opinion and assumed anyone willing to be a participant after learning the topic and intended use of their interview would naturally be against shale gas development, or would be searching for a venue to "grind an axe" against the industry. After the conclusion and subsequent processing of all the interviews, the reflective person stated that the results and overall encompassing themes were more honest and objective than previously thought, though he still maintained his conclusion that environmental concerns and loss of perceived power/ loss of control were the dominate themes.

Journaling

Throughout the course of interviews, a journal was kept. This journal allowed feelings to be cataloged during the research. Reactions to the interviews were recorded. For instance, during the second interview, it was assumed that the respondent would have

much more of an anti-fracking stance than was demonstrated. Assumptions such as these that were made about the respondents were listed in the journal.

The journal also contained writing about personal feelings of anger and frustration regarding shale gas development and coal mining in the Laurel Highlands. Feelings were recorded about current events pertaining to development in the area, such as review of emotions after a permit application for a deep mine in the area was submitted by a mining company. Keeping this journal helped to bracket out researcher biases, as both the researcher and reflective person were able to look back on what was written to ensure it was not mixed up with respondent perceptions.

Summary

This chapter listed background and demographic information about the participants as well as key themes that were found during analysis of resident interviews. Findings indicate that respondents are anxious about environmental effects and are disturbed by the industrialization of rural areas. They report feeling a loss of power and control in their lives due to industry influence in their community. They are also upset about outsourcing of natural resources. The combination of these factors is causing residents to question remaining in the area long term. The following chapter discusses issues that were addressed in Chapter 2 which also occurred in the Laurel Highlands.

CHAPTER 5:

REVISITING CHAPTER 2 ISSUES

Issues regarding shale gas have surfaced in other areas across the globe where development has occurred. Salient topics found through media and literature review include employment, out of town "riff raff", economic changes, pressure to lease and the pitting of neighbor against neighbor. Residents in this work discussed their perception of these issues in the Laurel Highlands. The topics depicted in *Table 5.1* surfaced through preparation for this work, and emerged in the research findings.

Table 5.1. Chapter 2 Issues

Tell me about what has changed since the natural gas industry came into your community?

Chapter 2 Issues	Participant Discussion
Changes in employment by knowing at least one local employee	03, 05, 06, 07, 09, 11, 12, 15, 16, 18, 19, 20
"Riff Raff"	01, 09, 12, 14, 20
Pressure from industry and/or community	01, 02, 03, 04, 05, 06, 07, 08, 14, 16
Pitting neighbor against neighbor	03, 04, 08, 11, 14, 18, 20

Employment

Goetz and Rupasingha (2004) reported that many rural residents leave their community in order to find better jobs. This was demonstrated in some of the interviews. One resident stated, "There is not a lot of industry for young people. They tend to move." Another commented, "There [are] fewer local people who actually stayed here and kept their homes. More and more [are] finding kids are leaving, go away to school and they don't come back." Respondents gave reasons for leaving the property owned in the Laurel Highlands to work elsewhere, and also talked about the decrease in activity of the coal industry and how this impacts shale gas development:

> *My only complaint and the only reason I moved was I couldn't find work that would support me and also allow me to make good savings for my retirement. I own property there, and I hope to go back, but right now I just can't make enough money to live there… I am one person who maybe fled the area. I know that there aren't a lot of young people left there. It's an aging population with few people paying in to the tax system… Because there's just not a lot of money, and what jobs there are low pay. (Resident 10)*

> *So many jobs are around coal and it's difficult to find good jobs or jobs that are physically safe… People work very hard there and people are doing jobs where they're coal miners are sort of risking their lives and their house to some degree to support the families. I haven't really seen that anywhere else I've lived.*
>
> *XXX Coal cut a bunch of jobs and I had friends at XXX whose husbands were getting laid-off… I feel like people are desperate to make ends meet in that region and just because my parents aren't going to [lease] doesn't mean somebody nearby wouldn't… I think we know enough to know that if a neighbor does it, it affects that entire area … (Resident 18)*

Another component of this research explored how Laurel Highlands' residents perceive changes in employment in their community due to shale gas development.

Employment in the industry and supporting fields can be seen by looking at the sample included in this research. Three respondents were directly employed in a direct facet of shale gas development. Employment varied from a land man, who worked on getting leases for drilling, to a driller, to a heavy equipment operator in a company digging pipelines. Others in the sample gained employment indirectly from the natural gas industry. Two participants reside in the Laurel Highlands to work for local organizations to raise awareness and provide information to the community and surrounding areas about shale gas development. These positions would not be available if there was not a need in the community due to changes from industry.

All participants were asked if they personally knew any Laurel Highlands residents working in the industry. Online reports and industry advertisements report that natural gas is bringing jobs and income to communities, reducing unemployment rates and allowing communities with limited options to prosper when the natural gas industry and its supports enter the area. Several residents interviewed for this research did not feel this was the case. For example, a male resident repots:

> *I have a niece that does title work for a company that does a lot of work for the gas companies, and she's the only person I know that's ever gotten a job. These guys - I mean that was their big cry. They were going to come in here and they were going to develop all these great local jobs. Well, you know what? I've seen a ton of shale sites and I personally maybe know one or two guys and they're either driving trucks or maybe running a dozer and then my niece that does title work but for as big as this boom is, darn few local jobs came out of it. (Resident 3)*

When asked if she has seen an increase in local employment as a result of the natural gas boom, the community organizer reported, “No. And all the studies are saying

that's just not happening the way they said it's going to happen." Another resident states that "It's brought a lot of work to the area for people, however it's not so much people that are living here, its people that are just coming in and then they'll be leaving."

As an industry insider, the land man interviewed feels the employment options are not for the residents of the Laurel Highlands. The respondent stated that companies "Are not really thinking, 'I want to have local employment.' They're not going to hire them if they don't have the skills. They're not going to pay to train them." When another industry insider was asked about other workers from the area, he reported working with three people from Pennsylvania, not specific to the Laurel Highlands, and that most of the other people on his drilling rig are from Texas, Oklahoma and Colorado. He feels that this is the reason why more workers are not hired from local areas:

> *They're bringing experienced people here because Pennsylvania… First drilling was here in Pennsylvania and then you know the big oil boom in Texas and Louisiana took everyone there and that's where it's always been most of the drilling throughout the world and Alaska. But all the experience is coming from around because they've spent the last 25 years, 30 years, 40 years drilling. You know there's no drilling [history] here in Pennsylvania.(Resident 9)*

Seventy percent of the respondents report knowing at least one person working is a facet of the natural gas industry. It is unclear if these are all different people as names were not given. No resident interviewed knew more than two Laurel Highland's residents who worked in shale gas development. A female resident stated "If one of their arguments is that we're bringing in industry, they're not employing anybody from here, they're bringing people in." One resident does not feel his perception of community has

changed from employment opportunities stating directly “I don't believe that there's an economic value because number one, I don't think that there is longevity in any jobs that they're providing… It hasn't changed my perception of the community.” The following statements are what Laurel Highlands’ residents feel regarding employment from shale gas development.

> *In the coal industry one of the things I think that originally was selling people on Marcellus Shale was the fact that it was going to provide all these jobs but I have not seen that happening. I know when they were fracking some of the wells near here that a lot of the workers that came from out of state, it was a West Virginia company that was doing the fracking and those were the guys who came and were working on the rig. I do know some local folks who are working in water hauling. There's a big water hauling company based in Somerset and there, there are some folks who work for that company, but they're not working around here you know in this immediate area. (Resident 12)*

> *Judging from all the increased truck activity and the influx of workers, there has to be a bump from that. Those guys have to be spending money, and they have to at least buy some of their stuff locally. Fuel, food… Stuff like that. And I guess the workers have to live somewhere. I’ve heard of people renting houses and apartments to them and that there is a bit of a bubble in the rental market due to them... I would say as far as working in the industry…I know this one dude that started driving a water truck for a drilling company. (Resident 11)*

> *I think that they're [gas and oil companies] manipulating people by offering a financial benefit. And people hear about financial windfalls that are received by other people where they're getting thousands of dollars a month from the gas that they're pumping from the land, and I think it's very minute and the opportunities are for the few and not for the masses. (Resident 6)*

> *Part of what’s fascinating or really even unsettling for me is that this industry is, it seems like the development is unless you’re very focused on it, I don’t think that the average person is in touch with the actual cause and effects surrounding this entire development. So from my vantage point I have seen people employed in the industry. I have seen people that are*

employed in the industry or by these companies related to the industry. Some of those jobs though are related to a broader industry, right? Not necessarily to the local economy… (Resident 13)

Subtheme: Employment shift. This work uncovered subthemes of change in Laurel Highlands' industry. Some residents feel that outside of the natural gas industry, there is a positive shift occurring with employment in the area. They perceive their community as morphing to an area with more options for employment, either through telecommuting or recreational positions in local tourist attractions.

For a long time the local kids that really either didn't finish high school or didn't go further onto college either went to the military. A lot of them never came back and then there [are] the kids that stuck around …every morning at 4:00 they would load into a car and drive two hours to some construction site somewhere and then drive home. That was how it used to be around here. So, I think that's changing.

It's nice to see more people coming back and I think that there [are] probably two things going on there. A lot of those people lost their jobs where they were living and came back here to family and then decided to stick around and get one of those virtual offices or if it was a job to travel to live around here because as far as I'm concerned, the quality of life around here is outstanding…

I think this area has developed enough that you can find work here and more and more, everybody has a virtual office from home. If anything, I'm starting to see people talking about coming back, either they've got traveling jobs or you know, they can work from home, and you know, there's a lot of people here that I call beltway expatriates, people who fled the D.C. beltway who live in this area now for that exact same reason. (Resident 3)

This region is probably on the verge of morphing into an area with an economy that's based primarily on recreation and I think its transitioning away from things like mining... some of the more industrial and extractive activities that the economy in this area was probably based on fifty years ago. My perception is that this region is preparing for some sort of transition. And I think largely it'll be positive in terms of protecting higher quality areas, sustainable lifestyle and practices. (Resident 12)

In this work there were other indications of change occurring in the employment options in the area. One resident reports he actually came to the area for employment, moving from a more urban center to work in the Laurel Highlands, as well as the case example of an interview participant. She was hired in to work for a gas company and was practicing in the Laurel Highlands. After leaving her position, she commutes two hours each way daily to work from the Laurel Highlands, so that she can continue to live on her farm.

"Riff Raff." As discussed earlier, some residents of areas where gas drilling occurred spoke of transient workers, living in the area while drilling and fracking is occurring. It was suggested that the *riff raff*, as they are called, caused change in the area, including possible increase in crime. This would require an increase in law enforcement, something that may not be accessible to remote and financially starved rural areas.

In this research, 25% of respondents discussed riff raff during the interview. One resident stated that he has not seen any negative effects, but is not ruling out the possibility that introducing shale gas industry workers to the Laurel Highlands may cause negative impacts in the future. Other residents reported negative changes occurring in the community due to the riff raff.

> *If you take somebody from a city environment and bring them into a rural environment, if they're not readily willing to assimilate themselves they're looking for, they may be looking for some type of action that's unavailable in a rural area. That's going to be a problem. I haven't seen that. (Resident 6)*

> I *have a friend that was a lady state cop... She informed him that there was state police present up here in Donegal for the first time ever. He said*

> *'Why was that?' She said that 'Coming from down South.' [Because of the workers]. That was the correlation I made. (Resident 1)*

> *Yes there are a lot of tourists that come here- that what I call the skiers and leaf lookers, and they are here because they enjoy the area. They buy big expensive house to live in one weekend a year and I think they cherish the beauty, so that's one thing. These yokels from Texas or wherever who work on drill sites, what do they care about the area? They will move to another county or state in a year. They don't care what they ruin. They aren't here to support us and make a better community. (Resident 14)*

> *You know when my fourteen year old daughter is locking herself in the house and calling my husband and saying, "there are a bunch of guys in the front yard and none of them speak English and they're putting flags all over the place" and she's freaking out I think that's totally unacceptable. (Resident 12)*

During one interview, an industry worker mentioned a local bar, in reference to a stabbing that occurred there in 2012. According to news reports, a man from Texas, who was employed as a pipeline welder, was convicted of an aggravated assault chart, after stabbing a patron of the bar (Kelly, 2013a). A resident interviewed, who is a mother, reported:

> *My neighbor finally came to me and said, "I'd like to drive [your daughter] from the bus stop until they're done doing this," and I said, "Well, why's that?" and he said, "Well, I just don't really like the way they look at her when they drive by." And I said, "Oh, okay. Yes. Please do." That's scary. I'm a mother of a daughter. Having a lot of people in this area who you don't know, we're not used to that… it kind of changes the community dynamic. (Resident 12)*

Respondents also had positive things to say about workers coming in from out of town stating "Well the guys we met were lovely people. They were nice fellas so no I wouldn't say that I had any concern about that." And one respondent who works in other areas throughout the state for a natural gas company reports, "Oh yeah, when we go out

in the community yeah people like to see us coming because they know we're spending money in the restaurants and bars." Other respondents felt that the out of town workers were a benefit to the local economy, boosting the resources available in the area:

> *They built a hotel in Donegal specifically for those people [gas industry workers]…That whole hotel, all those cars that you see there. And also the little general store/kind of diner, The Champion Market, 90% of it is pipeliners. They all do their lunches there.*
>
> *Everybody's kind of hurting now, so tourism is lacking. It's all trickle down. When things are bad, people don't go on vacation. I think this area has been hurting for a few years now. I will say this, I guess if some of those workers are kind of keeping some of these little stores and stuff, not necessarily keeping them afloat, but they're definitely adding to their revenue. (Resident 19)*

This research did not uncover negative impacts in local business from losing employees to the natural gas industry. At this point in the Laurel Highlands' shale development stage, it is doubtful that there will be an issue with not having enough jobs for laid off workers when the boom subsides. It is far more likely the people employed in the industry will be following the jobs to other communities, as they are not long term residents of the area.

Economy

Reports from various communities where deep gas drilling has occurred indicate that the economy shifts during and after drilling occurs. Town spending may increase and budgets may shift to accommodate the new industry. This may reverse when the industry moves from the town. There are also instances of residents reaping the benefits of deep gas drilling, leasing their land for the gas rights and getting royalties from the

production. On the flip side of that, there have been reports of property values diminishing from ruined land and water supplies.

In this research, a pipeline employee reports talked about positive changes in the community due to his increase in personal income, and discussed how the money he is making allows him to positively invest in the community by spending where he lives. A resident who leased his natural gas rights reported receiving one royalty check, but remained unsure if he would be receiving more and if so, how often, stated "In a wonderful world, if it turns out that we get that five hundred dollars a month for a few years… but it's basically like living with cancer." Another resident stated that "As far as economic development there are probably a few farmers that have benefitted financially but to the average person in the community landowners doesn't benefit… all the workers at these well sites are from out-of-state." A resident discussed how some people are leasing their land for shale gas development due to economic hardship that many in the area face. Other respondents talked about how some in the community are leasing their gas rights with thoughts of a brighter financial future.

> *It's up to individuals you know whether or not they're going to sell their property or their rights… this is a poor area. I mean I would even think twice if somebody comes in and says, "Hey, I'll give you 50,000 dollars to let me do this." I mean that would fix every problem I have so that's my concern- that it's not a community action. It's an individual action, and they're not going to look at in the long run, they're going to take the money and run basically. (Resident 19)*

> *My neighbor is gung-ho for the whole gas. He thinks it's great because he received a financial windfall. He received no royalties from any gas extracted because I don't believe any gas has been extracted or it may*

have been simply that they've run tests and it's not as readily available as initially thought. (Resident 6)

Increase in Traffic

Through research of shale gas development in other areas such as DISH, TX and Greene County, PA, there were reports of burdens placed on localities from wear and tear on the roads from shale gas development traffic. Small boroughs and townships did not have the resources needed to repair the local infrastructure. These issues have been occurring in the Laurel Highlands and were discussed by residents. A male resident stated, "It's all the traffic and with that you always see these tanker trucks, these fleets of red tanker trucks that are taking away the bad water, bringing in the good or whatever the hell they're doing." Talk of an increase is traffic continued from others, and some worried that the heavy truck traffic posed dangers to more than just to the roads.

I think the biggest problem in our community is the roads. The kind of wear and tear put on the roads and on that bridge that I was talking about earlier. They're not gonna fix the roads. They're not giving any money to the state and I think that the thing that angers me the most is the fact that they have a tax exemption so that they don't have to pay the state any money to do this, to repair the roads that they damage, to help offset costs of school taxes or land taxes, or anything like that. (Resident 2)

The biggest things I've noticed are the trucks. There are a considerable amount of big vehicles on all of the roads around here - the water tankers especially. The traffic is crazy. And the roads are getting terrible. I mean they're pretty heavy and these old back roads can't take it. You see a lot of the well pads if you look for them. Lots of new roads going through farmers fields around here. (Resident 11)

When they were fracking those wells the truck traffic was incredible. Where my daughter goes to school, water trucks lined up across the bridge waiting to take water out of the river, from what turned out to be an unpermitted withdrawal point, so there were traffic impacts, people were

> *really upset because the trucks were idling near the schools... For my own personal reasons I'm concerned. It worries me that she is walking home from the bus with all these trucks going by. .. I just spend a lot of time out on some of these back roads… so I'm concerned about that from two standpoints: one, personal safety and two the fact that some of those roads could be disrupted by heavy truck traffic. (Resident 12)*

This research provided insight about how residents perceive economic changes in the Laurel Highlands. Respondents do not feel that there have been economic benefits for community members, with the exception of some large landowners who received money to lease their land. Residents feel that the natural gas industry has exaggerated the economic benefits to the community that would occur with development. Respondents did report a large increase in truck traffic, and worry about townships being responsible for repair.

Pressure from Industry and Community

Feelings of pressure to lease for gas well drilling surfaced during 11 of the interviews. Residents discussed land men coming to their homes with monetary offers as well as neighbors leasing their property, which led to a feeling of pressure to get their fair share since the drilling was going to occur already.

Conversations with community leaders from other areas included stories about pressure from the natural gas industry, as well as neighbors to lease land. Some residents in this work reported similar things occurring in their situation. Resident talked about the tactics used to get them to sign, and the confusion they felt throughout the process.

> *These guys were insidious. They went and knocked on that door and then, knocked on that door. You didn't know what was going on. Before I signed, I investigated and I found out everybody around me had already*

signed. So then I figured 'What the hell?' I might as well sign because they're going to drill under me. I might as well get something. Well, I screwed up not realizing. See, Mr. XXX had gotten five dollars an acre. It wasn't worth it. We didn't know anything about prices. When they came around and offered five hundred an acre 'Hey, that's a hundred times more than what they were offered.' So a hundred times more, 'Wow, they aren't going to offer anymore?' The guy said 'No, that's it- $500.00. That's it.' So, everybody signed. So, I was the last one -- I may have been the last one in the area to sign. I figured 'My water is going to get screwed up anyways…'

Daniel Day-Lewis came to me and I signed! You know what I mean! I have nobody but myself to blame for that financially… I got ninety-five hundred dollars for my acres, five hundred dollars an acre times 20. If I haven't signed, three months later I could've got fifty thousand dollars. I always have to live with that. I have to put that behind me. It's hard. (Resident 1)

They were already on the map and so the only people who hadn't signed in this direct area here was a woman who we sold some land to and ourselves, well we saw some of the people who we thought really knew what they were doing, that they were smart people… (Resident 2)

There began to be some meetings, there were land men around here everywhere and I mean there were people with real concerns. Some of the older people in this area- they cranked every member to coal police. And they were afraid that they were going to be rolled over by another coal baron. So, there were people that had some real concerns. I think there was some real concern about what the effect of that could be. (Resident 3)

We all have wells…Some are very happy, some people even if they drilled on their property – aren't so happy because they had varied leases with a lot of loopholes, and those leases were rolled over into fracking leases, and some people didn't really think they signed up for fracking, so they weren't really happy with what happened to their property.

Before we could even have meetings to try to inform the public, about the implications – because there was information from Texas and Colorado– before we could even do that, they had land men just swarming the area they were everywhere. People don't have a clue what they were signing, and they signed up. You could go on the county site and there would just be hundreds of leases signed. (Resident 4)

Other reports from residents of the Laurel Highlands involved stories of leases which involve pooling of neighbors with large properties together. This has led to pressure from neighbors, as one's decision affects the other's, regardless of the stance on shale gas development. Laurel Highlands' residents report feelings of confusion about whether or not lease their land and how get a fair share of profits if they do lease. One male respondent reported that "the contract that I signed was so over the top in my -- negative impact for me that I'm just a fool. I gave away everything for a couple of bucks. It's like living with cancer now…" Themes of confusion about what was happening in the area regarding leasing continued, as well as neighbors leasing influencing decisions to lease or not lease were discussed by respondents.

> *They've approached us about leasing our rights to them… My neighbor is all gang-ho, he supports it 100 percent but his support is based upon them telling him about the financial upside. And because of the acreage he probably has about a hundred acres. They've already paid him. He's already signed up with a local--with a company to sell his rights for his gas below his land. He's already signed up for that. (Resident 6)*

> *I haven't heard any talk of anyone getting rich. It's like this is a big land play for pennies. There is so little money involved. And everyone gets offered something different. My brother lives in northern PA. He said a farmer there was offered like 5 or 50 dollars an acre, something low, and he took it. Like nobody knows what is worth what. (Resident 14)*

> *The other thing is a person that owns their own gas there is the quandary how do you get yourself a good deal? Who represents you? What is fair? There is no transparency in this market and it is not like the gas industry has set out clearing houses where they compete against each other and offer the best and most generate terms, they do everything in secret and lie about everything. So it is a market with no transparency so it is very difficult for the consumer or the seller of a natural gas resource to know if he is getting any kind of fair deal or not because the only way you can find out of people's deals is if they let you know and many people are reluctant*

to see what they have signed unless people don't understand what they have signed. (Resident 8)

It was 2008 when the big sighting of gas and oil was coming. In the 2008 summer, all I did was do research on gas and oil to see if that's something I want to do is sign because my neighbor had signed. And so I like day and night, I was on the computer and just researched everything possible. I came up with some really negative information. I mean, they banned it in California. They banned it from New York. And I'm thinking, "Why are they doing that here?" I thought that was ridiculous. So I didn't sign it but I got a job at this gas and oil. (Resident 16)

It's going to affect the people that live here that unfortunately are going to have this ridiculous amount of money waved at them, and this being a very poor, one of the poorest areas in the country… Are you thinking, "Hey I want to keep the trees nice, or hey I want to feed my kid this winter?" You know so you can't blame people who don't know better that you know they're going to get this money waved at them, of course they're going to sell you know. And it's a shame because they are not educated, you know they should get both sides of the story; I guess is what I'm getting at. They should be told that you know okay yeah, "We're going to give you know thousands of dollars, but you might not be able to drink your water." (Resident 19)

The following passage is the description provided by the land man interviewed in this work. In it she describes what that job entailed and continued by discussing how others in the company were trained to interact with rural residents (some in their own community) with whom the company was trying to obtain leases:

I remember when I went out with one of the land man; he was training me to be a land man. We walked into this house… This guy, he sat him down and he showed us everything about his home and he embraced that. And I got in the car with a guy, I said, "You didn't tell him about the water." And I was bringing these issues up and he said, "I think you're the wrong business." I'm like, "On my God. You're just going to screw this guy."

People don't really understand the industry because it is all about the money. What producer has the card so that they can go and develop and once they got it, once they develop, they go in, they do it as cheap as possible and they want to get the money out of it They're not doing it for

> *publicity. They're not doing it to make friends. They're doing it to make money. And if people accept that, then they'll understand it… But everybody thinks it's great. They're making money. But then they just leave and it becomes a ghost town. And people haven't adapted. It's like someone one quick lottery and then they leave. (Resident 16)*

Another resident reports that some people she has encountered are refusing to lease because of their personal values. She states that this is occurring regardless of neighbor or industry pressure:

> *Just because of principle she won't [lease] but I'm sure most people would say "What the heck? I'm going get drilled anyway, I might as well do it." But it's amazing how many people are saying no, despite the fact that that might happen. (Resident 4)*

This section illustrates the pressure many Laurel Highland's residents felt from the natural gas industry, as well as their neighbors, when faced with decisions to lease their land for shale gas development. Residents cite not knowing what their neighbors were doing and confusion about what was occurring with development in their area as factors affecting their decisions to lease. Residents were offered monetary incentives to lease and this money was a large deciding factor for some residents. The combination of these factors exerted feelings of pressure on individuals to lease their land for shale gas development.

Neighbor Against Neighbor

In this work 30% or respondents reported feeling that shale gas development is pitting neighbor against neighbor in the Laurel Highlands. Residents reported experiencing this directly, as well as being aware that it is occurring between those who are in favor of shale gas development and those who oppose it. These divisive feelings

are due to many factors, some of which include personal values, economic need, pressure to lease land for development, anxiety about environmental effects, and a town history of coal mining.

> *In a place that is still fairly Appalachian and a coal-based mentality that's drives a pretty deep wedge between the people who fear for their water, fear for their water resources and the guy that fears not being able to feed his family. I think they're two very distinctly different, two very polar positions but both of them have strong merit… If I was picking something that will be the biggest effect on the community, that there is a polarization and there are a large number of people who have genuine fears about what this would do to the valley and the property, what it will do to their homesteads. (Resident 3)*

> *Air pollution, frack ponds, pipelines are cutting through people's property and Irwin – they don't want pipelines, they're not leasing, but it's going to happen so yeah – there's hard feelings with a lot of people on both sides…When we go to zoning meetings, we speak, there's occasionally somebody there, who will get angry and say, we should all be leasing, we should all be drilling, its gas for the country, it's economically good, so there's always people that disagree with you. (Resident 4)*

> *We have been dealing with property rights issues right now and when it comes to shale gas, and I think I don't know if it's something that were wanting or not, but for gas the sub-surface rights, the mineral rights trump the surface, properties tax rights, conflicts between business donors and people and companies who have leased minerals who need them. (Resident 20)*

> *It also tends to put neighbor against neighbor because some people own gas, some people don't. Some people generally if they are wealthy they will sign no surface use agreements so they get no wells, compression stations any of the non-sense on their surface, but their neighbors often maybe land rich but cash poor, don't know any better they sign and based on what the land man promises them and they have given up their surface rights in perpetuity so it's not been a good thing for our community…I have been approached many times. One neighbor has leased they were very reluctant to tell me what they have really done. (Resident 8)*

> *I have friends from both sides on this. I mean the military guys for the most part are pro fracking. They seem leery of the environmental side effects cause they all hunt and fish, but for the most part they are in line with the right on it. I have friends on the other side, ranging from concerned to outright activists about it. Both sides are against their neighbor having drilling, like a nimby thing- Yeah, not in my back yard…. It seems like there is a lot of jealousy about who's getting paid and who isn't. (Resident 11)*

This research uncovered feelings of neighbors being pitted against neighbors in the Laurel Highlands, with those who are pro drilling upset with those who are opposing it and vice versa. Shale gas development is becoming a divisive community issue, and is causing feelings of frustration, anger and disappointment between those who may have once had close community ties.

Summary

This chapter discussed issues occurring with shale gas development in the Laurel Highlands that have also surfaced in other communities experiencing an influx of industry. It reviewed respondents' perceptions of economic changes, employment shifts, pressure from industry and community regarding shale gas development, as well as issues arising between neighbors and varying views on the topic. The next chapter will discuss these findings and limitations of this work.

CHAPTER 6:

DISCUSSION

This section discusses the results of this research in relation to theory and prior findings regarding rural sense of community. Analysis of interviews provided insight that residents have common ideas for dealing with changes in their community through community action, something that social workers can assist with and guide residents through community organization and advocating. This chapter also reviews limitations of the research that was completed.

Summary of the Research Findings

This research found that residents feel change is occurring within the Laurel Highlands from the shale gas development. The work uncovered changes in residents' sense of community (McMillan &Chavis, 1986), including changes in membership and influence in the community, as well as his/her fulfillment of needs and emotional connection with neighbors. This work also found that, in terms of membership in one's community, feelings of security and belonging have been altered.

In depth interviews, combined with media reports describe worries that community residents are having that their area is changing from a rural community supported by tourism, to a more industrialized town. Residents are concerned about their

health and water supplies. They are angry about the outsourcing of natural resources. Residents feel a loss of power, but are becoming more active and involved in their community to help support it. Industrialization and anxiety about the future is affecting quality of life and decisions to invest in the community. It is also influencing residents' decisions to remain in the area long term. *Table 6.1* depicts the findings.

Table 6.1. Questions/Key Themes

Phenomenon	**Research Question**	**Key Themes**
How do individuals perceive community change when industry enters the area?	How do you feel your perception of your community has changed with the addition of the natural gas industry?	• Anxiety due to environmental concerns about water, air and the land • Anger about outsourcing of natural resources • Feelings of loss of power and sense of control • Reduction in quality of life due to industrialization and anxiety about what is occurring in their community • Lack of resident stability

Linking Research Findings with Theory and Prior Literature

When discussing the findings of this work and linking them back to theory, I have to go back to the issue of environmental justice in social work. It is a challenging topic and any theoretical perspective that is discussed is often liked to a larger academic discipline. Social work does not have an "established theory" to use for this topic.

One may be able to use the ecological systems theory which focuses on group adaption (Robbins, Chatterjee, & Canda, 1998) for this work. The research looked at how the system (the Laurel Highlands) and its components (20 residents) adapted to changes within the environment (the community) as it shifts with an influx of industry. The work explored the interplay between these systems; the surrounding rural communities and their boundaries, including natural resources, industry, and jobs that come into an area due to the resources. Influences on the community and residents discussed in the interviews included the media, political forces, personal and town history, and personal values. These were some of the ecological systems explored throughout the course of this research.

Social and community development theory addresses issues related to a community's industry and economy (Payne, 2005). Subsets of this theory encompass the idea of eco development, where a community works toward a change that is able to be continued and does not deplete natural resources (Estes, 1993). Social and community development theory also describes capacity-building within the community, where residents take an active part in the growth and development of their neighborhood

(Payne, 2005). Community development has focused on the rural to urban migration of citizens of third world countries (Patel, 1988), but this is often overlooked within the United States. Social and community development includes social action and planning, where oppressed groups come together to help make changes that will support their needs (Payne, 2005). All of these things are components of social and community development which may lend it to be a shaping theory as to what is occurring with shale gas development. However, due to the lack of specific environment justice theory, this work utilized sense of community theory defined by McMillan and Chavez (1986) to frame the questions in order to link them with this theory.

Power and perception of community. One theme that emerged in the findings is an individual's sense of power and control. Residents discussed feeling that shale gas development has taken away their ability to control their community and they are feeling threatened by concerns about their health and water supply. Respondents expressed concern about their rural community turning into an industrial zone and some felt helpless to do anything about what was occurring.

"The power to make a difference is vital for personal and community wellbeing. There is physical and psychological power; there is the power of individual and the power of the corporation, the power of the citizen and the power of the state…" (Prilleltensky & Prilleltensky, 2006, pp. 261). Individuals, corporations and the power to make a difference are key issues that were uncovered in this research. Power is an area that social workers can assist with taking back. Social workers can help residents

identify specific areas where power is lacking, and assist with developing strategies to take back power where possible, using tools such as political advocacy and building linkages with other community supports.

Linking perception of community with the influence of industry to McMillan and Chavis's (1986) sense of community, it is evident to see how a typical Laurel Highlands' resident may have changing feelings about their sense of community. Residents expressed a lack of security due to the uncertainty of the future of their environment and health. Feelings of personal influence varied. Residents are feeling that outside forces from industry are having a substantial influence of their lives. However, this is leading to them to find ways to stand up to these forces to try and influence the community by advocating for their needs.

According to respondents, integration within the community and fulfillment of needs are difficult topics in the Laurel Highlands' community. Disagreements between residents who support shale gas development and leasing of land for natural gas extraction is leading to a lack of shared values with other community members who have feelings of opposition to shale gas development and fracking. According to McMillan and Chavis (1986), feelings of positive support occur where there is a shared emotional connection with other members of the community. Residents in this work who are teaming with others who share their opposition to shale gas development reported feelings of positive support due to these shared values. This led to a connection with

these residents. Respondents in this work expressed improved connection occurring through advocacy for their needs.

This research also supported Bachrach and Zautra's (1985) findings that in rural communities, close ties to the community lead to high utilization of coping skills to focus on addressing the negative community impacts. This work uncovered that residents with a high level of connection to their community are putting their focus on the negative community impacts by advocating for personal and community health and safety. They are advocating with local and state governments to provide them with legal options and policies that will protect their environment and health.

As stated earlier in this research, due to a lack of organized resources that are present in many urban settings, residents of rural communities have developed naturalistic systems in order to support their needs (Waltman, 2011). Reports from Laurel Highlands' residents found that in the area studied, these naturalistic systems include local watershed organizations, the Pennsylvania Conservancy and support from neighbors with similar values and needs.

This work found that some residents in the Laurel Highlands have leased their land for shale gas development and the reasons for this varied. Certain residents did it in order to make economic gains. Others reported that they felt they were pressured to do so, either by corporations or by their neighbors. Even some residents who did not own their gas rights or chose not to lease them reported their quality of life and environment were negatively impacted by the development. This work demonstrated that residents'

sense of community affected how these situations were handled, as well as their perception of community change from industrialization. Residents who felt positive support in their community from available resources as well other community members were more engaged and advocated for their needs.

Culture and geography. Residents of the Laurel Highlands live in the area for reasons specific to the community and environment. There is a greater distance between homes than in more metropolitan areas and some residents are more familiar with their neighbors and community members than their urban counterparts may be. The Laurel Highlands has few options for shopping and other daily activities, such as eating out or entertainment, so residents are more likely to see neighbors, friends or relatives while out in the community.

Residents of the Laurel Highlands choose to live there due to deep ties to the land and water and remain in the area for what the environment has to offer. The large expanse of natural woods and water are prime spots for hunting and fishing, with both locals and tourists engaging in outdoor recreations. Residents and tourists enjoy skiing, hiking, biking, kayaking and rafting. These activities help to improve the connection between residents and the natural environment. Some residents of the Laurel Highlands are every engaged in their communities and the activities it offers, and also have the deep bonds between their families that Dillon and Henry (2008) discuss. These bonds may help residents cope with stress from community change and industrialization.

The geography and climate of the Laurel Highlands plays a prominent role in the community and lives of residents. The terrain is very mountainous and makes travel in the winter difficult, decreasing ease of access to stores for necessities, hospitals, and schools. Due to limited employment options in the area, some residents of the Laurel Highlands have long and expensive commutes to work. There is only one public transportation option – a bus that runs on an extremely limited schedule and requires transportation to and from stops. This affects employment opportunities for those without personal transport.

In the Laurel Highlands, there are few mass communication options and media sources, such as the internet and cable television. Cellular phone service is not available in all parts of the area. There is one company supplying a majority of the internet, cable and phone services. These services are also expensive, due to the monopoly providers may have on different sub communities of the Laurel Highlands. This makes it difficult to access quick and current information for some people in the area, especially low income residents.

Due to limited communication with people outside of the area and lack of access to important media and news content some resident have, Laurel Highlands' residents may rely on what they are told by neighbors or naturalistic community resources. These may include the church, local bars and clubs, as well as local publications, regardless of the reliability of what is being presented. During this research, residents discussed getting varying information about shale gas development depending on word of mouth

sources in their community, with little regard for accuracy. This was especially true when initial leases were presented to them, leading some to regret the agreements they made with shale gas development companies.

Industry and education. Laurel Highlands' residents discussed a past of natural resource extraction in the area, reviewing a history of coal mining which provided jobs for locals, income for the community, but also polluted local water systems. With limited employment options, the community has suffered from what Goetz and Rupasingha (2004) discussed – a rural area with few higher educational opportunities for residents and many rural residents who did receive formal training left the area in search of more skilled and higher paying jobs that were unavailable to them where they grew up. In the Laurel Highlands, this is a factor in decision making for residency as expressed for some respondents who left the area for other jobs.

The Laurel Highlands' natural resources provide recreation for residents and tourists, sustenance and recreation from hunting, fishing and farming, as well as employment from the tourism and small local businesses in the area. Despite some discussion in this work about lack of employment, other respondents stated they felt this was changing and more people are able to remain in the area and find productive employment.

Recently there has been an increase in telecommute positions available. This allows people to work from home, limiting the time and expense of driving to cities for work. There is also a push by some residents for the Laurel Highlands to develop a

tourism based industry with sustainable employment. Ski resorts have led the way with this and have been employing people for more than 70 years. Residents now say there is a shift to greatly limit natural resource extraction and base the economy on eco-tourism. Outside of the ski resorts, there are more options for recreation in the other seasons. These include expansion of the bike trails in the area, and increasing the water recreation options.

Resident perceptions. Laurel Highlands' residents discussed the economic, social and physical effects occurring as shale gas development grows in their community. The information gathered may be used to help inform social workers what one population of rural residents is experiencing as a result of industry in their area. This information can then be used to inform and direct practice and at the micro and macro levels, as well as influence capacity building and policy development.

Some residents and local organizations are experiencing immediate economic benefits with incentives to lease acreage for shale gas development. A portion of the profits made may be given to them if natural gas production from the well is successful. Other residents have been able to gain employment in a part of shale gas industry. Each interview subject cited an average of one person they know from the Laurel Highlands working in a facet of the industry. However, it is unknown if these are 20 different individuals, or if there is some overlap between employees.

Along with the benefits, residents discussed risks associated with shale gas development. People in the Laurel Highlands talked about fears that their water was

being contaminated and concerns for their air quality, especially after being aware of strange smells coming from fracking sites. Homeowners report they are worried about the structural security of their houses when the ground is fracked. They are also concerned about the security of well casings which are in place to keep the gas from migrating to their water wells and ground supplies. Residents of the Laurel Highlands discussed the impacts of high truck traffic on their local roads and concerns with the safety of this high volume of traffic.

At this stage of shale gas development in the Laurel Highlands, there have been limited reports as to the long term effects of the process on the health and safety of community members, environmental impacts and local economies. It is unclear how residents, small farms and local businesses will be affected by the industry in the long term. It is unlikely that Davenport and Davenport's (1981) boom town model will be applicable to the Laurel Highlands in terms of shale gas development, if resident reports of limited employment from the industry prove true in the long term.

Residents are concerned about environmental effects from shale gas development. They are upset about the outsourcing of natural resources that are being developed at their expense. Respondents feel that they are experiencing negative environmental and possible health effects, while not receiving any benefit from the shale gas that is being extracted. They are seeing changes in their quality of life, as their community show signs of a shift to more a industrialized landscape. They report feelings of loss of power and sense of control of their environments due to these factors. In turn, this is affecting their

decisions to remain in the Laurel Highlands in the future. Some residents are increasing their community action to help with power and control deficits they are experiencing.

Along with these issues, residents are feeling a sense of pressure from the industry and neighbors to participate in shale gas development. There is discord between residents who are for shale gas development and those who oppose it. Residents feel they are lacking reliable information and are asking for more information regarding the effects of shale gas development, as well as protection and regulation from local, state and federal government.

Limitations

Addressing methodological issues of trustworthiness. This qualitative work was a beginning step in determining the needs of those individuals residing in communities where shale gas development has permeated the area. This found meaning and context as to what was occurring within one rural community. Several of the steps taken were geared at addressing limitations of qualitative research. These included triangulation of data, inclusion of quantitative questions, discussion of limitations that did occur and member checking. Specifically, if the participant agreed to it during the initial interview, as all 20 participants did, member checking was done following data reduction of information. Statements were reread to ensure that the essence of the meaning had been accurately captured and remarks were clarified as needed.

The final sample helped support the process of triangulation as well due to its diversity - varying in age, sex, income, relationship to the area and land, as well as the

inclusion of shale gas development workers. Having variety in the sample allowed for diversity in responses and perceptions. Another way that the work was triangulated was through the interview. The guide contained open and close ended questions which covered a wide range of issues surrounding perception of community change from industry. Participants were able to get information across in different ways providing distinctive types of responses to the questions.

Due to lack of availability, a second coder was not utilized, which was a limitation of the study. A second coder would have strengthened the work through employment of an outside source to determine if coding was done correctly and no codes were overlooked. Instead of a second coder, a reflective person was used to review the transcripts. This person provided what he felt were salient themes of this work through a summary statement written at the end of each transcribed interview.

Transferability of the work. A phenomenological research method allowed for in-depth information to be gathered through resident interviews. However, this type of qualitative research possessed many methodological concerns, including lack of generalizability and researcher bias (Creswell, 2007; Strauss & Corbin, 1998). Due to the nature of qualitative work, generalizability is low. The intent of the work was not for broad generalizations to be made, but instead to provide rich descriptions of a few lived experiences as well as provided possible insight about what other communities undergoing the same process may be experiencing. Understanding the needs of rural populations is important so that social workers may adequately prepare themselves to

help support local residents with any social justice concerns they may have as shale gas development occurs.

This work was a small scale study uncovering the perceptions and needs of a community only beginning to see change from industry in their community. Social workers may use this work as an example of what residents in one rural community know about shale gas development and are experiencing as it changes their community. From this, they may begin to explore the area they serve for similar knowledge and needs.

Ethical concerns. Ethical issues were limited in this work, due to the voluntarily nature of the work. Participants were made aware of the subject being studied and had the option not to participate. They were also provided with a consent form to help them make an informed decision about whether or not to participate in the research. This work strived to ensure that it depicted what the participants were hoping to communicate with truthfulness and a reverence for the area. Special attention was paid to minimize identifying details about participants, settings where interviews occurred, as well as neighbors they referred to during interviews. This was done in order to ensure confidentiality of the respondents and others in their community. As the work was set in a small, rural community, even identifying characteristics such as age were generalized in order to protect the respondents of this work.

Respondents. Employment in the industry may have affected the responses of some participants. For example, during an interview with one industry worker, the resident silently mouthed an answer opposite to the response verbally given on the

interview tape. When the interview was concluded, the respondent let the researcher know that participating in the work was a breach of the non-disclosure agreement signed in order to work in his company. It is unclear how much issues such as these affected the responses of subjects working, either formerly or currently, in a facet of shale gas development.

Throughout preliminary research of the topic, another limitation was discovered, as one group was unable to be included in the sample. This group was people who have had negative experiences with some aspect of shale gas development and were engaged in a law suit with a corporation. During a lawsuit, the involved parties are not permitted to speak about what is occurring, and often part of the settlement requires that the person(s) involved do not speak about what occurred. This may have been a hindrance to obtaining a more representative sample of the Laurel Highlands community, and also provided the sample with a common factor- none of the respondents were in litigation or had signed non-disclosure agreements.

There were other factors which should be noted as to who was chosen as sample participants. While piloting interview questions three people refused, all of whom were working in the natural gas industry, due to concerns that this work would find the portrayal of the topic “unfavorably”. Outside of the three respondents included in the sample who are employed in shale gas development, there were five other potential industry participants approached to be a part of this work. Three stated that they signed non-disclosure agreements when they contracted with their various companies, and were

therefore unable to talk about the industry. The remaining two scheduled interviews and when the researcher showed up, each participant said that they did not want to talk then and would reschedule. The researcher contacted each person two more times, but another interview time was not given by the potential respondent.

Changes to interview guide. In reviewing this research, it was found that some changes could have been made which would further strengthen the work. First, the interview guide would be clearer and more appropriate for the work, if the wording was changed. The term "natural gas industry" could be changed to "shale gas development." Participant responses were geared towards the entire shale gas industry, including leasing, pipeline development, drilling, fracking and production of shale gas, all of which would be better summarized with the term "shale gas development." This term was used throughout this work to describe the industry being studied after it was found that respondents encompassed all aspects of the natural gas industry- from exploration to development- in their responses.

A few issues need to be addressed with the *Final Thoughts* section of the interview guide. *Question 1* in this section asked "Would you recommend that deep gas well drilling be continued in your area?" with *Question 2* being the qualifier "Could you explain this to me?" A majority of residents in this work did not give yes or no responses to this and had long qualifying answers. Many residents' responses indicated that they were resigning themselves that the development was going to occur and they answered this with what they would like to see happen with shale gas development to make it safer

for themselves, families and communities. What was said in response to this question is found in *Appendix E*, which lists full recommendations and needs of Laurel Highlands' residents in relation to shale gas development.

Throughout the course of interviews, it was determined that *Question 5*, "Do you think the U.S. should continue to pursue this as an alternative to other forms of energy?" and the qualifier *Question 6*, "Can you explain?" were interchangeable with *Question 1* and *Question 2*. The answers and qualifiers given were the same for each question; therefore it was not necessary to provide answers to each question.

Question 7 in this *Final Thoughts* section also was not included in the analysis, as participants stated during in depth questions that they got a majority of their information from media sources, mainly the Internet. This response was not included when developing the questionnaire and should be included in future research.

Question 5 that was included in the quantitative demographic section, "Please name all the outdoor activities that you have done in the past five years?" proved too descriptive to include in the demographic section or a table. Each respondent had different activities and needs that were being fulfilled outdoors in the Laurel Highlands natural areas and each response had already been discussed in while talking about perception of community or needs. These activities were discussed in the *Respondents* section of *Chapter 4*.

Summary

This chapter discussed the findings of this work through a summary of residents' perceptions of shale gas development in the Laurel Highlands. It reviewed the geography and industry of the area, as well as employment options for residents. It also discussed limitations of the work. The final chapter of this work contains recommendations for social workers as well as suggestions for future research.

CHAPTER 7:

CONCLUSION

In order to explore the phenomenon of how individuals perceive rural community change from shale gas development, a qualitative study was undertaken. This research examined 20 Laurel Highlands' residents through in depth interviews. This information was triangulated with media sources and other documents provided by participants. Using techniques Moustakas (1994) recommended for analyzing phenomenological data, transcripts were reviewed and a working knowledge of the data was gained. The data was then horizonalized and themes were uncovered. These themes were given structural and textural descriptions. The information that was uncovered provided in depth information about rural resident perception of community change from shale gas development.

The process began with observation of the Laurel Highlands community which demonstrated that something major was occurring. Local and national media relating to the issue of shale gas development was reviewed in order to see what was happening in other areas. After assessing the situation in this manner, literature was reviewed including social work, public health and economics, and it was determined that there was a gap in social work literature that needed to be filled with a basic examination of how

rural residents perceive the changes in their community from industry. The focus of this work is important and topical, with its focus on shale gas development and the processes it entails, including fracking.

Recommendations

I can now go back to the work of Rogge (2008), who stated that environmental justice "embodies social work's person-in-environment perspective, dedication to people who are vulnerable, oppressed and poor, and is embedded in sustainability development" (Rogge, p. 136-137). The social work profession needs to encourage research and practice in broader environmental issues as it affects all persons. It would be a mistake to think this is just a "poor person's" issue. Shale gas development is having negative impacts on all populations, regardless of income. One difference is that wealthier individuals have the ability to move away when they feel their environment or health is in jeopardy. The poor are not able to relocate as easily, if at all. Social workers can bring people of all economic statuses together on this particular issue and collectively discuss and decide how to proceed.

Shale gas development and its effects on residents and communities is a great opportunity for the profession to build capacity between different economic statuses. This is a reason social workers need to look at the "social movement" literature to develop tools to bring diverse groups of people together and help to find strategies to create change to combat negative impacts from this industry.

Based on this research, what do residents in the Laurel Highlands want to happen in their changing communities? When asked if shale gas development should continue, residents responded that they would like more information and protection from the environmental impacts they are concerned about. They also talked about needing regulation to help protect them. This work set out to allow the voices of Laurel Highlands' residents to be heard, and what they are saying is that they feel that the natural gas industry needs to be properly regulated by all levels of government, as well as in the communities where it is occurring. Participants feel that this is the best way to have their lives, communities, health and safety protected in the short and long term. *Appendix E* contains excerpts from interviews and describes these needs in the voices of Laurel Highlands' residents.

Social workers need to listen to the populations they serve that may be affected by shale gas development. They need to be advocates for individuals and families to help them navigate the various systems included in what is happening as industry enters their area. Social workers can assist as community organizers; linking people with similar needs together, as well as to the necessary community resources. They can help gather and distribute reliable and vital information to residents. Social workers can also advocate for policy and change.

In order to assist with information distribution, social workers need to remain up to date on shale gas development in their area. The effects of the extractive industry and the supporting industries have far reaching community impacts. From this work, we see

that residents are concerned about health and environmental impacts, as well as heavy industry. Social workers can gather resources to provide information about these things and link residents with the sources. Social workers may also provide information about legislation relating to shale gas development and environmental protection. It is important that this information is from an impartial and scientific source, as well as easily understood by the population it is being given to.

Once information is given to the public, social workers will then be able to assist with organizing the community in a variety of ways. First, they may lead community forums to answer questions that residents have about what is occurring with shale gas development and link residents with others in the area who have similar questions and concerns. Social workers may provide local resources to assist with other needs, such as attorneys for legal questions. Social workers can use the research skills they possess to help find evidence of the impacts that the community may be facing and then help set goals for the community. Another important on-going task for social workers will be to work with community members on capacity building by helping to develop local leaders (Chun-Chung Chow, 2005).

Social workers may help organize communities to advocate for policy change. This may be done by determining gaps in legislature and making the public aware of where regulations are falling short. They can also work with the public to inform and shape policy based on community needs.

This work found that a majority of residents are worried about environmental impacts including contaminated water, air pollution, threats to wildlife and vegetation, as well as earthquakes. Knowing that the fears and worries residents have about long term environmental effects is a way to start assisting a rural client base experiencing shale gas development. Social workers can utilize the skills they have to help residents with the increase in anxiety that they are experiencing. Tools such as development of coping skills and anxiety reduction techniques may be taught to residents. Local mental health services, including outpatient therapy may aide in this.

Social work skills may be applied to residents who are reconsidering long term residency in rural areas, due to industrial change. This work found that residents may not want to stay in the Laurel Highlands if their health is threatened or recreational activities limited. Feelings of uncertainty about their future may lead to anxiety and disconnect from the community. Social workers can assist residents in planning alternatives for their future, and help clients build positive coping skills during these times.

Social workers may also assist with the loss of power and sense of control rural residents are facing. By looking at where there is an imbalance of power and helping residents find ways to stabilize this, social workers may empower clients and increase individual locus of control. Social workers may be able to do this by serving as mediators and help with disputes between neighbors and groups on both sides of the shale gas development fence. Using mediation strategies learned may assist disagreeing residents

come to mutually beneficially results. This in turn may help improve wavering community and neighborly ties.

Suggestions for Future Research

Future exploration regarding industrial development in rural areas could be done in various ways. Residents may ask for information and feedback. People need evidence based knowledge about the drilling process and effects of natural gas extraction in their communities. Community members want this information to be given to them easily, honestly, and by reliable scientific sources in order to help them and their neighbors make smart, well informed decisions.

Laurel Highlands' residents may be experiencing feelings of disenfranchisement due to the industrialization of the area. Towns that were once rural sanctuaries used for recreational activities in the natural environment are now seeing many industrial changes. These include increases in truck traffic, landscape changes for fracking and pipeline placement, as well as water and air pollution. Anxiety and stress levels are increasing from this industrialization. Future research of shale gas development could include questions to see if disenfranchisement is occurring. Social workers can apply their training to help the variety of feelings rural residents may have.

Previous research has suggested that as rural areas develop economically, there will be more environmental and social justice concerns that require an increase in community activism from all levels, and rural areas will need to develop their own programs (Carlton-LaNey, Murty & Morris, 2005). Perhaps future research regarding

rural areas could examine the grassroots community programs that are put in place to help support resident dealing with shale gas development.

Future research may also focus on residents leaving areas when development occurs. This subject is often overlooked in social work literature, as many times people move to an area when there are jobs and new industry. This work demonstrated the opposite- that some people may leave a community to avoid industry, especially if that community was sought out as a way to escape industrialization.

Summary and Conclusion

Using an in depth qualitative approach, this work explored the concerns and needs of a changing community by examining how individuals perceive change in the Laurel Highlands from shale gas development. This work found that residents of the Laurel Highlands perceive their landscapes as becoming more industrialized and are fearful about future impacts to their environment, leading to a feeling of powerlessness. These issues are affecting their quality of life, and depending on how serious the future effects from deep gas drilling are, many are reconsidering their futures in the Laurel Highlands.

Along with these changes, shale gas development has encouraged some Laurel Highlands residents to take a more active role in their community and has increased community connections. Residents also have strong ideas about changes that should be made in their communities to help protect their environment, future and regulate industry impacts. Social workers may be called on to assist rural community residents with the impending changes from shale gas development.

REFERENCES

American Rivers. (2009). America's *Most Endangered Rivers, 2009 Edition*. AmericanRivers.org.

Appalachian Regional Commission. (2010). *The Appalachian Region*. Retrieved from http://www.arc.gov/appalachian_region/TheAppalachianRegion.asp.

ATLAS.ti (Version 6.2.23). (2011). [Computer software]. Berlin: GmbH Scientific Software Development.

Bachrach, K., & Zautra, A. (1985). Coping with a community stressor: The threat of a hazardous waste facility. *Journal of Health and Social Behavior, 26*, 127-141.

Balingit, M. (2012, February 12). Gas well fire extinguished in Mercer County. *Pittsburgh Post-Gazette.* Retrieved from http://www.post-gazette.com/stories/local/breaking/gas-well-fire-extinguished-in-mercer-county-214283/.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report, 13*, 544-559.

Berg, B.L., & Lune, H. (2012). *Qualitative Research Methods for the Social Sciences.* Upper Saddle River, NJ: Pearson Education Inc.

Black, S.G., McKinnish, T., & Sanders, D. (2005). Tight labor markets and the demand for education: Evidence from the coal boom and bust. *Cornell University ILR school, ILR Review, 59,* 1.

Bluestein, G., & Smith, V. (2010, April 10). Mine Rescue Effort Turns to Recovery. *The Associated Press.* Retrieved from http://www.msnbc.msn.com/id/36183425/ns/us_news-life/print/1/displaymode/1098/.

Bowen, G. A. (2005). Preparing a qualitative research-based dissertation: Lessons learned. *The Qualitative Report, 10,* 208–222.

Burns, R., Lynch, M.J., & Stretesky, P. (2008). *Environmental Law, Crime, and Justice.* New York: LFB Scholarly Publishing LLC.

Carlton-LaNey, I., Murty, S., & Morris, L. (2005). Rural community practice: Organizing, planning, and development. In M. Weil, M. Reisch, D. Gamble, L. Gutiérrez, E. Mulroy, & R. Cnaan (Eds.), *The Handbook of Community Practice.* (pp. 402-418). Thousand Oaks, CA: SAGE.

Chun-Chung Chow, J. (2005). Community-based research methods in community practice. In M. Weil, M. Reisch, D. Gamble, L. Gutiérrez, E. Mulroy, & R. Cnaan (Eds.), *The Handbook of Community Practice.* (pp. 504-619). Thousand Oaks, CA: SAGE.

Chavis, D.M., Lee, K.S., & Acosta, J.D. (2008). *The Sense of Community (SCI) Revised: The Reliability and Validity of the SCI-2*. Paper presented at the 2nd International Community Psychology Conference, Lisboa, Portugal.

Chol, C. (September 4, 2013). Confirmed: Fracking practices to blame for Ohio earthquakes. NBC News. Retrieved from http://www.nbcnews.com/science/fracking-practices-blame-ohio-earthquakes-8C11073601.

Conrad, C. (2008). *Development in Extractive Communities: Ridgeway's and St. Mary's, Pennsylvania 1850-1914* (Doctoral Dissertation, University of Pittsburgh). Retrieved from http://search.proquest.com.ezproxy.lib.usf.edu/pqdtft/docview/304496577/fulltextPDF/13907ACC7433C4CCAA0/1?accountid=14745.

Craig, J. (2011). *Strengthening Democracy, Increasing Opportunities: Impacts of Advocacy, Organizing, and Civic Engagement in Pennsylvania.* Washington D.C.: National Committee for Responsive Philanthropy.

Creswell, J. (2007). *Qualitative Inquiry and Research Design.* Thousand Oaks, CA: SAGE.

Davenport, J., & Davenport, J. (1981). Rural communities in transition. In L. Ginsberg (1993 Ed.), *Social Work on Rural Communities* (pp. 27–51). Alexandria, VA: Council on Social Work Education.

D.B. Burnette Global Petroleum Research Institute & C.J. Varva Separation Sciences Guru Food Protein Research Center. (2006). *Desalination of Oil Field Brine-Texas A & M Produced Water Treatment.* Retrieved from http://www.pe.tamu.edu/gpri-new/home/BrineDesal/MembraneWkshpAug06/Burnett8-06.pdf.

Dillon, M., & Henry, M. (2008). Religion, politics and the environment in Rural America. *Carsey Institute Reports on Rural America*, *3*, 1-8.

Drisko, J. (1997). Strengthening qualitative studies and reports: Standards to promote academic integrity. *Journal of Social Work Education, 33,* 1, 185-197.

Dufalla, K. (January 29, 2013). Water in Greene declining. *Herald-Standard*. Retrieved from http://www.heraldstandard.com/opinion/letters_to_the_editor/water-quality-in-greene-declining/article_f085e9f6-f405-5df6-9b68-7646352a7028.html.

Earle, J. (1997). *A Cross-Cultural Study of Individual Attitudes Toward Natural Resources and Natural Resources Development, San Luis Valley, Colorado* (Doctoral dissertation, University of Colorado). Retrieved from http://search.proquest.com.ezproxy.lib.usf.edu/pqdtft/docview/304366904/fulltextPDF/13907AF144456419A00/1?accountid=14745.

Englander, T., & Lash, G. (2008, January 17). Unconventional Natural Gas Reservoir Could Boost U.S. Supply. *Penn State Live- The University's Official News Source.* Retrieved from http://live.psu/edu/story/28116.

Environmental Protection Agency. (2002). *Evaluation of Impacts of Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reserves, Table 4-2.* Retrieved from http://www.earthworksaction.org/fracfluidslarge.cfm.

Estes, R. (1993). Toward sustainable development: From theory to praxis. *Social Development Issues, 15,* 1–29.

Fractracker.org. (2013). Unconventional wells retrieved from http://maps.fractracker.org/latest/?appid=28041aae3e674e04b0f987f047f3fe59.

Geology.com (2013). *Marcellus Shale – Appalachian Basin Natural Gas Play*. Retrieved from http://geology.com/articles/marcellus-shale.shtml.

Ginsberg, L.H. (1993). *Social Work in Rural Communities*. New York: Council on Social Work Education.

Goetz, S.J., & Rupasingha, A. (2004). The returns to education in rural areas. *Review of Regional Studies, 34,* 3, 245-259.

Grahamm, D. (2010). *Montcoal Mine Explosion: A Reminder of the Continuing Dangers for Miners.* Retrieved from http://blog.newsweek.com/blogs/thehumancondition/archive/2010/04/06/montcoal-mine-explosion-a-reminder-of-the-continuing-dangers-for-miners.aspx.

Halliburton.com. (2013). *Hydraulic Fracturing*. Retrieved from http://www.halliburton.com/public/projects/pubsdata/hydraulic_fracturing/glossary.html.

Hand, H. (2003). The mentor's tale: A reflexive account of semi-structured interviews. *Nurse Researcher: 10, 3,* 15-27.

Hendryx, M., & Ahern, M. (2008). Proximity to coal mining in West Virginia *American Journal of Public Health, 98,* 669–671.

Hendryx, M. (2008). Mortality from heart, respiratory, in kidney disease in coal mining areas of Appalachia. *International Archives of Occupation and Environmental Health.* Retrieved from http://link.springer.com/article/10.1007%2Fs00420-008-0328-y.

Hendryx, M., Ahern, M., & Nurkiewicz, T. (2007). Hospitalization patterns associated with Appalachian coal mining. *Journal of Toxicology and Environmental Health, Part A, 70,* 2064-2070.

Hill, C.E., Knox, S., Thompson, B.J., Nutt -Williams, E., & Hess, S.A. (2005). Consensual qualitative research: An Update. *Journal of Counseling Psychology, 52,* 196-205.

Hoff, M., & Rogge, M. (1996). Everything that rises must converge: Developing a Social Work response to environmental justice. *Journal of Progressive Human Services 7,* 41-58.

Holstein, J.A., & Gubrium, J.F. (1994). Phenomenology, ethnomethodology, and interpretive practice. In N. Denzin & Y. Lincoln (Ed.), *Handbook of Qualitative Research* (pp. 262–272). Thousand Oaks, CA: SAGE.

Hopey, D. (2012, January 3). Wastewater disposal wells under scrutiny following Irvin leak. *Pittsburgh Post-Gazette*. Retrieved from http://www.post-gazette.com/local/region/wastewater-disposal-wells-under-scrutiny-following-irvin-leak-1200922/.

Johnson, J.M. (2002). In-Depth Interviewing. In J. Gubrium & J. Holstein (Ed.), *Handbook of Interview Research Context and Method* (pp. 103-119). Thousand Oaks, CA: SAGE.

Kelly, S. (March 10, 2013a). Jury finds Texas man guilty in bar fight case. *Herald-Standard*. Retrieved from http://www.heraldstandard.com/news/local_news/jury-finds-texas-man-guilty-in-bar-fight-case/article_d9e4b8f6-2cf5-51ba-95f2-ec1433df1a43.html.

Kelly, S. (January 8, 2013b). Man complains gas company did not repair fence. *Herald-Standard.* Retrieved from http://www.heraldstandard.com/marcellus_shale/man-complains-gas-company-did-not-repair-fence/article_ec1ef9e4-b1e5-5a92-ab30-6cf4fba76ac0.html.

Kenarov, D. (February 8, 2013). Shale gas development threatens daily industry. *Greene County Messenger.* Retrieved from http://www.heraldstandard.com/gcm/news/local_news/shale-gas-development-threatens-dairy-industry/article_81a96959-6d0a-5c1b-b661-ab0ea6980375.html.

Laurelhighlands.org. (2013). Retrieved from: http://www.laurelhighlands.org/getting-here.asp.

Lee, T.W. (1999). *Using Qualitative Methods in Organizational Research*. Sage Publications, Inc.: Thousand Oaks, CA.

Marcellus-Shale.us. (2013). *Natural Gas < Production Process< Drilling*. Retrieved from: http://marcelluscoalition.org/marcellus-shale/production-processes/drilling/.

Marcellus Shale Coalition. (2010). *What they are saying: Marcellus Shale creating a "modern day gold rush."* Retrieved from: http://marcelluscoalition.org/2010/06/what-theyre-saying-marcellus-shale-creating-a-modern-day-gold-rush/.

McMillian, D., & Chavis, D. (1986). Sense of community: A definition and theory. *Journal of Community Psychology, 14*, 6-23.

McNair, R., Taft, A., & Hegarty, K. (2008). Using reflexivity to enhance in-depth interviewing skills for the clinician researcher. *BMC Medical Research Methodology.* Retrieved from http://www.biomedcentral.com/1471-2288/8/73.

Milici, R.C. (2000). Depletion of Appalachian coal reserves: How soon? *International Journal of Coal Geology, 44,* 251–266.

Morgan, R. (January 24, 2013a). Earthquake insurance covers fracking. Herald-Standard. Retrieved from http://www.heraldstandard.com/news/local_news/earthquake-insurance-covers-fracking/article_0c418c41-1f3b-565e-9905-d80df2b38624.html.

Morgan, R. (January 27, 2013b). Fracking taps a mile deep danger. *Greene County Messenger*. Retrieved from http://www.heraldstandard.com/gcm/news/local_news/fracking-taps-a-mile-deep-danger/article_06f134ac-a1f1-5483-8dee-2f356017fdb5.html.

Morgan, R. (January 24, 2013, Part 1). DEP shelves more stringent water test. *Herald-Standard*. Retrieved from http://themarcellusshale.com/dep-shelves-more-stringent-water-test./

Morgan, R. (January 27, 2013, Part 4). Fracking wastewater can be highly radioactive. *Herald-Standard*. Retrieved from http://www.heraldstandard.com/news/local_news/fracking-wastewater-can-be-highly-radioactive/article_d97e6d1b-1396-500f-a0cc-b521dd9861f0.html.

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage.

NASW. (2008). *NASW Code of Ethics*. Retrieved from http://www.socialworkers.org/pubs/code/code.asp.

Ove, T. (2012, June 16). Greene County business man gets probation, fines for illegal dumping. Pittsburgh Post-Gazette. Retrieved from http://www.post-gazette.com/stories/local/washington/greene-county-business-man-gets-probation-fines-for-illegal-dumping-640611/.

Patel, D. (1988). Some issues of urbanization and development in Zimbabwe. *Journal of Social Development in Africa, 3,* 17–31.

Payne, M. (2005). *Modern Social Work Theory*. Lyceum Books, Inc.: Chicago, IL.

Polkinghorne, D.E. (1989). Phenomenological research methods. In R.S. Valle & S. Halling (Eds.), *Existential-phenomenological perspectives in psychology* (pp. 41-60). New York: Plenum Press.

Prilleltensky, I., & Prilleltensky, O. (2006). *Promoting Well-Being: Linking Personal, Organizational and Community Change*. John Wiley & Sons, Inc.: Hoboken, NJ.

Robbins, S., Chatterjee, P., & Canda, E. (1998). *Contemporary Human Behavior Theory.* Allyn & Bacon: Needham Heights, MA.

Rogge, M. (2008). Environmental Justice. In T. Mizrahi & L.E. Davis (Ed.), *Encyclopedia of Social Work* (2010). Oxford University Press. Retrieved from http://www.oxford-naswsocialwork.com.ezproxy.lib.usf.edu/entry?entry=t203.e132.

Saldaña, J. (2013). *The Coding Manual for Qualitative Researchers*. Sage Publications, Inc.: Thousand Oaks, CA.

Schutt, R. (2012). *Investigating the Social World.* Sage Publications, Inc.: Thousand Oaks, CA.

Seelye, K. (2011, October 14). Gas boom aids Pennsylvania, but some worry over the risk. *New York Times.* Retrieved from http://www.nytimes.com/2011/10/15/us/hydraulic-fracturing-brings-money-and-problems-to-pennsylvania.html?pagewanted=all.

Smrtlearningchannel. (2011). Retrieved from http://www.youtube.com/watch?v=lB3FOJjpy7s&feature=related.

Strauss, A., & Corbin, J. (1998). *Basics of Qualitative Research*. Sage Publications, Inc.: Newbury Park, CA.

Stretesky, P. & Lynch, M.J. (1999). Corporate environmental violence and racism. *Crime, Law & Social Change, 30*, 163-184.

U.S. Census Bureau. (2002). Retrieved from http://www.census.gov/geo/www/ua/ua_2k.html.

U.S. Census Bureau. (2013). Retrieved from http://www.census.gov/.

Waltman, G. (2011). Reflections on rural social work. *Families in Society: The Journal of Contemporary Social Services, 92*, 236–239.

Witter, R., Stinson, K., Sackett, H., Putter, H., Kinney, G., Teitelbaum, D., & Newman, L. (2008). *Potential Exposure-Related Human Health Effects of Oil and Gas Development: A White Paper.* University of Colorado, Denver. Colorado State University.

Yin, R.K. (2011). Qualitative Research from Start to Finish. Guilford Publications, Inc.: New York, NY.

APPENDIX A

FRACKING VIDEO

http://www.youtube.com/watch?v=lB3FOJjpy7s&feature=related

Source: Smrtlearningchannel (2011).

APPENDIX B

SEMI-STRUCTURED INTERVIEW GUIDE FOR *RURAL COMMUNITY CHANGE*

(I will open with some brief small talk and lead into the interview questions.)

1. What is your perception of your community? (Prompt question: what are the needs you and your family have that are being met by living in this community?)

2. How do you feel your perception of your community has changed with the addition of the natural gas industry?

3. Tell me about what has changed since the natural gas industry came into your community?

(Prompts may be)

a. What changes did you see when deep gas well drilling industry first entered the area?

b. What changes occurred while *fracking* and/or drilling was occurring?

c. What changes have occurred since drilling ended?

4. How do you feel/see your community's economy has changed since the natural gas industry entered it?

5. How do you feel/see your quality of life has been affected since the natural gas industry entered your community?

6. Are you concerned about (Prompts to ask about)?
   --the new employees that have come into town?
   -- any increase in crime?

APPENDIX B (CONTINUED)

7. What are your health concerns since the natural gas industry entered your community? (Prompts may be to discuss water and or air quality issues/changes)

8. What are your needs since the natural gas industry entered the community?

9. Could you please describe your connection with other community members?

10. Do you participate in any community groups? (Can you tell me what these are and your involvement in these?)

11. How do you feel that your involvement in these groups influences the community?

12. Has this changed due to the natural gas industry coming into the community?

INFORMATION ABOUT THE PARTICIPANT AND COMMUNITY

Now, I would like to ask questions about you and your household.

1. How long have you lived on this land?

1-5 years □ 6 to 10 years□ 11 to 15 years□ 16 to 20 years□ More than 20 years□

(Code 1)____ (Code 2) _____ (Code 3) _____ (Code 4) _____ (Code 5) _____

2. Do you own land? □ Yes (Code 2) ____ □No (Code 1) _____

3. If so, how much?

Less than one acre.□ 1-5 acres. □ 6-10 acres. □ Over 10 acres □

(Code 1) (Code 2) (Code 3) (Code 4)

4. Do you own your gas, oil and mineral rights?
Yes (Code 2) ___ No (Code 1) ___

APPENDIX B (CONTINUED)

Fill in any information: _____

5. Please name all outdoor activities that you have done in the past five years:
   Hunting □ Fishing □ Boating □ Kayaking □ Rafting □
   Hiking □ Other □
   (Code 1) (Code 2) (Code 3) (Code 4) (Code 5) (Code 6)
   (Code 7)

Fill in Other:_____

6. Where do you get your information about the deep gas well drilling industry?
   Television □ Neighbors □ Newspaper □ Internet □ Town meeting□ Local Government□ Other□
   (Code 1) (Code 2) (Code 3) (Code 4) (Code 5) (Code 6)
   (Code 7)

7. Do you feel/think you need more information about the deep gas well drilling industry?
   Yes No
   (Code 2) (Code 1)

8. If so, what is the most important information you feel/think you need to have?

Fill in:_____

9 . Are you employed?
   Yes □ No □
   (Code 2)___ (Code 1)___

10. **(If yes**) What do you do? _____

11. Education level:

Graduated high school□ Some trade school□ Graduated trade school□ Some college□ Graduated college□
(Code 1) (Code 2) (Code 3) (Code 4)
(Code 5)

APPENDIX B (CONTINUED)

12. Male □ Female □
(Code 2)__ (Code 1) __

13. How many people do you live with? _____

14. Household income:
Less than $10,000-$20,000 □ $20, 0001-$35,000□ $35,001-$60, 0000□ □
Over $60,000□
(Code 5) (Code 4) (Code 3) (Code 2)
(Code 1)

FINAL THOUGHTS

1. Would you recommend that deep gas well drilling be continued in your area?
Yes No
(Code 2)___ (Code 1) ___

2. Can you explain this to me?

Fill in:

3. Do you feel there should be changes made within community regarding the natural gas industry?
Yes No
(Code 2)___ (Code 1) ___

4. If so, what changes?

Fill in:

5. Do you think the US should continue to pursue this as an alternative to other forms of energy?
Yes No
(Code 2)___ (Code 1) ___

6. Can you explain?

APPENDIX B (CONTINUED)

7. Where do you think you are getting the best information about what deep gas well drilling is doing to the community?

Politician □ Local citizen groups□ News outlets□
Neighbors□ Community contacts□
(Code 1) (Code 2) (Code 3) (Code 4)
(Code 5)

8. Is there anything that wasn't included in this interview that you would like to tell me?

Fill in:

9. Are you willing to be contacted at a later date via telephone to review your responses?

Yes No
(Code 2)___ (Code 1) ___

10 If yes, what is your home phone number?

Fill in:

Thank you for your time and this opportunity to speak with me. I appreciate your remarks.

APPENDIX C:

INFORMED CONSENT

Informed Consent to Participate in Research

Information to Consider Before Taking Part in this Research Study

IRB Study # _____

Researchers at the University of South Florida (USF) study many topics. To do this, we need the help of people who agree to take part in a research study. This form tells you about this research study.
We are asking you to take part in a research study that is called:
Rural Communities: How do individuals perceive community change when industry enters the area?

The person who is in charge of this research study is Katherine D. Ferrari, LCSW. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge.

The research will be done at the home of the participant, or a community location chosen by the participant.

Purpose of the study

The purpose of this study is to

1. Provide a qualitative analysis of the lived experience of residents of the Laurel Highlands experiencing community change from the natural gas industry.
2. This study is being conducted for a dissertation to fulfill the requirements for the degree of Doctor of Philosophy in the Department of Social Work at the University of South Florida.

Study Procedures

If you take part in this study, you will be asked to

- 1) Participate in an interview about your experience with the natural gas industry.
- 2) The interview may last up to 60 minutes, depending on your willingness and time. There may also be a follow up phone interview, in order to answer any questions the researcher may have about the initial interview
- 3) The interview will be done in an area specified by the participant and may be carried out at home or in the community. It will take place on a date/time agreed upon by the researcher and participant.
- 4) The researcher will be making a digital voice recording of the interview in order to ensure accuracy when reviewing the information. The tapes will be accessible to the researcher, a transcriptionist and the dissertation committee. The information will be identifiable by a case number assigned by the researcher. The tapes will be maintained for five years after the interview and then deleted.

Alternatives

You have the alternative to choose not to participate in this research study.

Benefits

We don’t know if you will get any benefits by taking part in this study.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation

We will not pay you for the time you volunteer while being in this study.

Confidentiality

We must keep your study records as confidential as possible.

- Recordings will be stored for five years after the interview.
- Recordings be kept confidential and kept secure by being placed in a locked drawer in the researcher's office.
- Digital audio tapes may be provided to the researcher's dissertation committee if requested.

However, certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:

- The research team, including the Principal Investigator, study coordinator, and all other research staff**.**
- Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the study in the right way. They also need to make sure that we are protecting your rights and your safety.) These include:
    - The University of South Florida Institutional Review Board (IRB) and the staff that work for the IRB. Other individuals who work for USF that provide other kinds of oversight may also need to look at your records.
    - The Department of Health and Human Services (DHHS).

We may publish what we learn from this study. If we do, we will not let anyone know your name. We will not publish anything else that would let people know who you are.

Voluntary Participation / Withdrawal

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study, to please the investigator or the research staff. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.

Questions, concerns, or complaints

If you have any questions, concerns or complaints about this study, call Katherine Ferrari at 724-812-1101.

If you have questions about your rights as a participant in this study, general questions, or have complaints, concerns or issues you want to discuss with someone outside the research, call the Division of Research Integrity and Compliance of the University of South Florida at (813) 974-9343.

If you experience an unanticipated problem related to the research call Dr. Sondra Fogel at 813-974-5078.

Consent to Take Part in this Research Study

It is up to you to decide whether you want to take part in this study. If you want to take part, please sign the form, if the following statements are true.

I freely give my consent to take part in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

_____ _____

Signature of Person Taking Part in Study Date

_____

Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect.
I hereby certify that when this person signs this form, to the best of my knowledge, he or she understands:

2. What the study is about.
3. What procedures/interventions/investigational drugs or devices will be used?
4. What the potential benefits might be.
5. What the known risks might be.

_____ _____

Signature of Person Obtaining Informed Consent Date

Katherine Ferrari, LCSW

Printed Name of Person Obtaining Informed Consent

APPENDIX D:

IRB APPROVAL LETTER

USF
UNIVERSITY OF SOUTH FLORIDA

DIVISION OF RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-5618

December 10, 2012

Katherine Ferrari

RE: **Expedited Approval** for Initial Review
IRB#: Pro00010724
Title: Rural Communities: How do individuals perceive community change when industry enters the area?

Dear Ms. Ferrari:

On 12/8/2012 the Institutional Review Board (IRB) reviewed and **APPROVED** the above referenced protocol. Please note that your approval for this study will expire on 12/8/2013.

Approved Items:
Protocol Document(s):
Ferrari Rural Community Change

Consent/Assent Document(s):
Informed Consent Rural Community Change.pdf

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review categories:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Please note, the informed consent/assent documents are valid during the period indicated by the official, IRB-Approval stamp located on the form. Valid consent must be documented on a copy of the most recently IRB-approved consent form.

APPENDIX D (CONTINUED)

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

APPENDIX E:

RESPONDENT NEEDS AND CHANGES

What are your needs now that the natural gas industry is in your community?

Resident 10:

Transparency. I think that the Department of Environmental Protection in Pennsylvania is not doing its job at all. So I don't trust the industry now, absolutely not. They have too much interest in making money. They just want a return on the money that they're putting into it, and they're putting more into it than they possibly can. So what information do I want from them? I think they should have some regulation. I definitely think the people should have some long-term benefit from this huge boom of wealth that could potentially be the natural gas industry.

Resident 2:

Regulations. I don't see it stopping. I don't see that it's a bad thing necessarily. I just think there needs to be more regulations and more monitoring. I think there needs to be more people. The DEP, they have two people that do all of Westmoreland County… How can they possibly be policing it? How can they possibly know all of the infractions? So there are more regulations, but there still need to be even more… They're not happy about the environmental regulations because it's really cutting into their production and their profits. But I say to them "yeah, but it's your life, the quality of your life…"

Resident 10:

I just wish that something could be done, and I would like to be a part of that and I need capital to do it. So it's a shame that the only capital that's coming in to be infused into that area is from elevating gas industry… We can regulate them better if our Environmental Protection Agency were

more robust… They've been bought and sold… the people aren't in control of them anymore, but the people aren't aware of that for some reason.

Resident 18:

I think they should be mandated that they have to have like say to us how involved this is really and tell us exactly what they're doing, tell us the risks. It seems unfair to me that they can tell you all this great stuff, but you know, oh let's just not pay attention to that, you know, you sweep under the rug. I think that should be the law. I think they should be required to do that. I mean I think people might be a little more hesitant about it if they knew that you the chemicals and what's going into the ground.

Resident 13:

I want just objective facts-based information on, okay, this is how drilling occurs. I mean I understand I don't have an engineering background, but I think that you can explain it in a way that's accessible to a large section of the population, right? And so explain to me how it happens. Explain to me what the risks are. Explain to me what you're doing to limit those risks…. And so even though a lot of the contractual relationships from my understanding have already been established, the, the economic implications or other issues related to the contract might still remain. And I think we just need to get channels of communications and education generally going on these issues. I want to have a better understanding of what this industry is about, how it works and really what are the, what are the benefits, the true benefits and the true costs on the land. Because as a community from a community perspective, you can't understand the danger or the risks until you get the facts.

Resident 7:

I would like more information and I would like some guarantees that my water supply will be inversely infected. Or you know the environment in general… The water is the main thing just because that's all I know that there has been problems with before. And it's pretty you know tangible thing. And a pretty serious thing.

APPENDIX E (CONTINUED)

What changes do you think should be made within the community regarding the natural gas industry?

Resident 10:

I definitely think that we could be smarter. I don't buy that we have to do everything as cheaply and as quickly and foolishly as possible. I think that human power could be something of value. It's a problem that no one wants to pay humans, but they need to mine natural resources to do all the work for them… If it must happen, I guess those in Pennsylvania should be getting huge taxes on it, as in tax revenue. There should be something calculated in to protect the water and to potentially restore the water back to the state that it was in before the drilling happened, which is frankly not even possible, but I think it could serve them well to do the research. I believe that it's possible that the gas could be extracted safely… We very well may need it until we can change our infrastructure to utilize solar, for instance, or biodiesel fuels… I don't think they should do it until they're research has been done, until the money is in place.

Resident 11:

First and foremost I think there should be more regulation for the industry. It really seems like they are trying to get as much drilled and prepped before any actual rules are put in place. I think we need to take a long look at what they're pumping into the ground…They say their fracking fluid is proprietary…They're pumping this stuff into the water table for Christ's sake. I can't see it hurting anything to slow down and find out what hazards there are before drilling anymore.

Resident 15:

Look, if companies- drillers and trucking and pipeliners follow the rules that are set, it would be safe. It's when they don't that accidents happen. So I think the rules that are in place should be followed. There are regulations. They need to be enforced and that's up to the companies.

Resident 12:

I don't feel that Pennsylvania is adequately prepared to regulate these issues. I don't feel that West Virginia was adequately prepared to regulate these issues, which is why the area I grew up in is such a disaster. I think Pennsylvania is possibly even less equipped than West Virginia. I think that without some degree of community control over placement of structure related to shale gas drilling that all of these communities, all of these small rural areas are going to be negatively impacted. There's always and opposition to zoning in rural areas and I think that's unfortunate. Because I think zoning is a really good tool for protecting high quality areas, residential areas, and areas that you just really don't want to be developed. I think that with that being stripped from communities across Pennsylvania by Act 13 it's going to be very difficult for any of these communities to resist the onslaught of shale gas drilling. I think all of these rural, small rural areas should take a really hard look at where their jobs and where their income is coming from because I think if they were to do that they would see this inherent conflict between recreation and tourism and shale gas drilling. I think if that were the case it might be easier to convince some of these folks to press for the ability to use zoning for example to control placement of well sites and related infrastructure.

Resident 4:

They need to stop fighting to get the DEP to weaken laws. We need those laws stronger. We need politicians who are stronger; we need the governor who cares about air and water; who doesn't get a million dollars in illegal contributions. They lowered standards just they were supposed to be stronger standards for NOX DEP didn't go with it, they got pressure from the industry, there was supposed to be stronger water standards, they were lowered… We need tougher standards; we need to tougher laws with air and water… There should be no frack pits, their highly toxic, they leak, the lines – the casings aren't good enough.

Many of our friends are trying to move… Yes. Many have said they were going to move, and then they thought – we'll wait and see, how much we can restrict because Act 13 was overturned, the zoning portion of it by the state courts, but it's under appeal at the state's Supreme Court. A lot of people are waiting to see what happens with that, but within our group some people have already left.

APPENDIX E (CONTINUED)

Resident 18:

I guess people monitoring and more regulations and to assure that there's protection for people who are leasing their land and ... I would say we need to put the brakes on it for a while. Until we know more about it and I feel like there are more regulations to protect the environment, to protect people's property and people's rights.

Resident 16:

More regulations and true regulations. Not one that are you know that there, that there may be uh, things that over-looked… You know often times they'll say, "Oh that doesn't, you know that doesn't cause the water to do that." Well there's, I saw it physically, and people that were affected and how it was covered up. How they got paid off to help get their water supply back, but then they weren't allowed to talk to anybody about it. You know there's pay-offs and you know they want to keep it quiet. They don't want people to know. And that bothers me. We all have the right to know everything about anything that can potentially be dangerous… Well, I don't know if there's other ways to do it? If there's other ways to get gas that may cost more and are safer, then yes. And you know engineers, there may be other ways. I'm not familiar with them but if there are other ways, I think they should be pursued that way. Because we do have to have you know, heat. ..I can't really think of anything other than the fact that I hope that … it's going to be more regulated you know, and true regulation to protect the environment and the people that will be affected by it.

Resident 14:

I can't really think of anything other than the fact that I hope that … it's going to be more regulated you know, and true regulation. To protect the environment and the people that will be affected by it. Which is really everyone, isn't it?

Resident 8:

Well there is a whole litany of things. I could start with fossil…the problem with fossil fuels is when you externalize the costs and prioritize the profits you drive down the apparent costs of fossil fuel extraction as far as a market place is concerned, but this is a false impression because they are externalizing all their negatives on the local communities whether it is the brewed subsidies they get in terms of being able to pollute the air or pollute the water and hurt public health and those are giant, giant subsidies… I think probably 98% of the pollution could be vindicated at a rather low cost if the industry was just forced to do so if there were just solid standards… First of all you would have no outline of well-sites. You would have like we have heard from Showman who came and had a proposal about the watershed and how they would have a line all their sites use sump pump systems so any water flowing into that site would never get into the ground water and that would use that to frack that made lots of sense. No frack ponds makes lots of sense, no flaring of wells makes lots of sense, there is a whole bunch of fearing minor mechanical changes to be made to their systems to reduce vending of methane that could reduce that tremendously. There are other things to be done as far as mandating recycling our water, also they can frack with non-poisonous chemicals could be evolved. They could also disclose to the communities what these chemicals are. Another thing is we have seen nobody talk about the Shell workers or their public health or safety. There is a whole community of guys who handle highly toxic chemicals and go from well to well in high pressure who don't belong to any union and I am sure have nobody monitoring the health impacts on this body of principle young men and young women who work at these well-sites. Now in spite of what the industry says Shell Fraction of gas started in 2002. It does not have a 70 year track record; it doesn't even have a 10 year track record so we have no idea of the healthiness of the populations of worker handling their toxins down the road. There has also been very little concerned addressed a human impacts. Noise, light from the well construction and when you talk to the industry they even go and quiet these things down well why would they do that just to just in an urban area. If there are people living close by even if there is less of them they are still impacted and they probably live in the country because the appreciate the quiet and when you have less ambient background noise, noise tends to be more of an irritant. I can hear my neighbors dogs bark at 1000 yards. I don't hear

dogs in the city barking 1000 yards away. So any kind of noises from drilling operations and compressors can impact the locally community. These can all be easily addressed. There are all kinds of mufflers and things they can do to quiet all this stuff down. They can also don't have to operate 24-hours a day including on weekends.

Do you think deep gas well drilling should continue in your community?

Resident 2:

Let's say yes based on contingency, based on regulations...let's do this cleaner, let's do this better, let's do this safer. Of course the big thing is that they keep going deeper and deeper. So there in the Onondaga here, not the Marcellus, it's deeper, but the next layer down is what they're really aiming for. That's 3 miles deep. That's where the big gas is. That's where the big money is. And they're gonna be having that technology so there's no stopping it. So let's just do it better, safer…. Better and safer. Now there are a lot of people who say no, they shouldn't do it anymore, but until we have cleaner technology, cleaner energy technology, I think it's something that's gonna be happening so let's just do it better.

Resident 12:

I think they need to slow it down where as what they seems to want to do like what's happening with Marcellus Shale, is they want to ramp it up. It's not going to go away and it's not going to stop, but I would like to see the government taking measures to find less disastrous alternatives. We know every energy source comes with conflicted negative. I'd like to look for something that comes with more positives than negatives. Hydraulic fracturing to me is not the answer to that. I think it comes with more negatives than it does with positives.

Resident 3:

This gas is coming out of the ground one way or the other, right? I would recommend it continued or the fracking continue but it should be highly, highly regulated and because I don't think the state is going to do that and I don't think the feds are going to do that…I mean if I could just say moratorium right now - until the regulation and the oversight is better, I would say yes, absolutely more - maybe like what New York State is doing. New York State has said, "Hey, we're going to let all those other states make their mistakes, right? We're going to learn from that and when they start fracking here, we're going to do it right, okay?" That to me would be the perfect scenario. Again, this gas is coming out of the ground and I really don't have a problem with that as long as it's strictly regulated, as long as - I mean, just like - I mean it should be like a slaughterhouse. You

know, there's a USDA guy in every slaughterhouse. Why isn't there an EPA guy on every one of those sites?

Resident 10:

I feel like we need to put the brakes on it right now and continue researching it. Especially in places where they've already have it going on; try to clean that up and get that safer for the people there instead of just plowing through the rest of the country, the rest of the watersheds. Try to figure out how to make that safer for the communities they've already seriously affected.

Resident 14:

Can we fast forward 10 years and show me what the water and land will be like? That's what I want to know. The rest, I know. Maybe I am a conspiracy theorist, but I don't trust big business and industry or the government protecting us. They want money and are bought and sold by each other. Our best interest is not of concern. Neither are the animals or the earth.