We Didn't Start the Fire: Gas Drilling in Pennsylvania Before the Marcellus Boom

by

Marcy J. Ladson

BA, Pennsylvania State University, 2010

MA, University of Pittsburgh, 2014

Submitted to the Graduate Faculty of the

Kenneth P. Dietrich School of Arts and Sciences in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2019

UNIVERSITY OF PITTSBURGH

DIETRICH SCHOOL OF ARTS AND SCIENCES

This dissertation was presented

by

Marcy J. Ladson

It was defended on

April 8, 2019

and approved by

Allen Dieterich-Ward, Associate Professor of History, Shippensburg University

Molly A. Warsh, Associate Professor, Department of History

Mari Webel, Assistant Professor, Department of History

Dissertation Director: Edward K. Muller, Professor Emeritus, Department of History

We Didn't Start the Fire: Gas Drilling in Pennsylvania Before the Marcellus Boom

Marcy J. Ladson, PhD

University of Pittsburgh, 2019

The Pennsylvania Marcellus natural gas boom that began in 2005 caused a game-changing increase in global energy resources. It also caused significant national controversy, as the threats of gas drilling to land, water, and health became a big story. Why did the gas industry expand so quickly in a state with long experience of the environmental degradation and regional poverty left in the wake of extractive industry of all kinds? The Marcellus gas drillers successfully capitalized on the use of new drilling technologies and new geological knowledge, but these were not the only factors at play. In addition, the industry's landscape of opportunity included the existing physical, social, and legislative structures that made Pennsylvania a drilling-friendly region. Those structures are the legacy of energy extraction in the Appalachian region, especially during a previous state gas boom in the 1970s and 1980s. The negative impact of gas drilling on people and the environment during that earlier boom prompted the passage of Pennsylvania's 1984 Oil and Gas Act, the legislation still in place when the Marcellus boom began. However, the 1970s energy crisis and the advantages of natural gas compared to coal had established gas extraction as primarily a public good. Only in defense of state and national park land did grassroots citizen campaigns and mainstream environmental organizations present serious objections to drilling. Although the 1984 Act established restrictions to protect people and the environment, the desirability of gas helped keep regulations relatively lenient. This study focusses on a variety of stakeholders in gas-rich areas of Erie, metropolitan Pittsburgh, and rural Appalachia, during the last third of the twentieth century. These actors, in coping with the impact of gas drilling then,

helped shape the development of the current gas boom, with all its significance for the future of fossil fuel use and global climate change.

Table of Contents

Preface

A heartfelt thank you to my advisor Edward K. Muller, and committee members Molly A. Warsh, Mari Webel, and Allen Dieterich-Ward. From them I received invaluable guidance and feedback. They listened when I needed to talk, and never failed to send me back to work energized, and with a clearer idea of how to proceed. In addition, thank you to Dr. Joel Tarr of Carnegie Mellon University, for particular advice on ways to approach the history of natural gas.

Thank you to members of the History Department who were also instrumental in getting me through the program, especially Rob Ruck, Lara Putnam, Michel Gobat, Gregor Thum, John Stoner, Liann Tsoukas, and Tony Novosel. Many thanks to administrators Patricia Landon, Grace Tomcho, and Kathy Gibson, who take care of us all. Thank you to my friends in the History Department graduate cohort, who helped me many times with everything from reading my stuff to moving my furniture. Special thanks to Bethany Wade.

Grateful acknowledgment to the Kenneth P. Dietrich School of Arts and Sciences for supporting my dissertation research and writing through the Social Science Doctoral Dissertation Fellowship, the Lillian B. Lawler Fellowship, and the Samuel P. Hays Research Grant. Thank you to the staffs of the Pennsylvania State Archives, and the University of Pittsburgh Archives, who provided much-needed guidance and assistance.

Finally, I am very grateful for the love and support of my family. I received priceless encouragement and practical help from my sisters and brothers, and inspiration from my parents Michael and Marilyn Sincevich. Most of all, I'm grateful to Joe, Simone, and Tom; and Jim, my husband and partner of 40 years.

1.0 Introduction

"I am particularly interested in two intertwined approaches: environmental history that details the politics, policy, and popular consciousness that shape decision-making; and environmental history that explores the impact of those decisions on nature and landscape."[1]

Our Ladson family has farmed in Maryland and Pennsylvania for more than one hundred years. But each generation moved to different land, part of a widespread agricultural retreat from the pressures of suburban sprawl. In 1986 my husband and I bought our Bedford County dairy farm, which lays in a slender valley of fertile soil atop limestone bedrock, just one ridge east of the Allegheny Front. This region of Pennsylvania is on the border between the larger diversified farms of the central valleys and the smaller part-time subsistence farms of the Allegheny Mountains, where the inhabitants historically have strong connections to extractive industries like timbering, mining, and gas and oil drilling.[2]

The previous owners of our place had leased drilling rights to a gas company in the early 1980s, when there was renewed interest in conventional gas drilling in Pennsylvania. When they retired and sold us their farm, they characterized this lease, which transferred with the deed, as a benefit. No drilling activity had actually occurred. The income from the lease was enough to pay the property taxes.[3] We felt no particular alarm about the encumbrance, and after the first few

---

[1] James Longhurst, "'Typically American': Trends in the History of Environmental Politics and Policy in the Mid-Atlantic Region." *Pennsylvania History: A Journal of Mid-Atlantic Studies* 79, no. 4 (2012), 409.

[2] Pennsylvania Agriculture History Project, "Pennsylvania's Historic Agricultural Regions," Pennsylvania Historical & Museum Commission, accessed March 21, 2014, http://www.portal.state.pa.us/portal/server.pt/community/pennsylvania%27s_agricultural_history/2584.

[3] Louise Long to James and Marcy Ladson, personal communication, August 1986.

years of our ownership, we never heard from the company again. As several very busy decades passed, we forgot all about it. Then, during a mortgage refinance a couple years ago, a title search unearthed the old lease. We were appalled. I had just finished a writing project about Pennsylvania's energy landscapes, so I knew about some of the problems involved with mineral rights issues and the new hydro-fracking technology. Most people I knew had heard of the Marcellus shale gas boom. The accusation that gas drilling had ruined the water wells in Dimock, Pennsylvania, was big news. As it turned out, the gas company had allowed our lease (and dozens of others in Bedford County) to lapse in the early 1990s. We no longer faced the possibility that someone else had the power to decide how our land would be used. It was clear to us that the farmers before us, who had decided in the early 1980s to allow drilling, had done so under a different set of circumstances and assumptions than ours. Their decision, in the context of that era, represents only one of the many events that eventually enabled the natural gas industry to capitalize on the geological and technological discoveries that opened up the tremendous opportunities of the Marcellus shale reserves.

Pennsylvania natural gas is big news, with national and global significance. During the last ten years, a vast increase in natural gas supply and reserves has had a global impact on energy use. The expanded supply has caused large shifts in the power politics of the fossil fuel industry, which has been the basis of the world economy since the 19th century industrial revolution. Anyone who bought gasoline during the 2014 Christmas season, when the price unexpectedly fell below $2.00 per gallon, experienced the economic game-change of a natural gas glut. Natural gas will continue to gain global importance as fuel for the energy-intensive societies of this century. Clean-burning gas is a valuable alternative to dirtier fossil fuels while renewable sources increase and improve.

For the United States, natural gas is an important domestic resource, an alternative to dependence on imported petroleum. Nevertheless, natural gas comes with its own disadvantages and risks, which make its extraction and consumption highly controversial. All types of gas drilling contaminate ground and surface water. Gas leaks and explosions occur whenever gas has been used. During the last ten years, objections have centered on the hazards of new drilling techniques: hydraulic fracturing and horizontal drilling.[4] Despite these risks, Pennsylvania has maintained generally favorable legal, social, and economic conditions by which the gas industry can capitalize on new technology and the discovery of new reserves. The history of natural gas during the latter half of the twentieth century presents a number of the reasons why the fracking boom succeeded so well in the state. The experiences of earlier actors shaped landowners' values and views, the state regulatory climate, and gas industry tactics during the current Marcellus period. The social and regulatory framework that developed during the 1970s and 1980s provided the landscape of opportunity for the twenty-first century Marcellus shale gas boom.

1.1 Natural Gas and Pennsylvania's Appalachian Energy Landscape

The '70s and '80s were transitional years in Pennsylvania's energy landscape. The federal deregulation of natural gas pricing caused renewed interest in Pennsylvania natural gas, long after the bulk of the industry had moved to the Southwest. Expansion of drilling within the state was shaped by several critical national developments. The 1970s saw the rise of the modern environmental movement, the first energy shortages, concurrent economic stagnation, and the

[4] Vaclav Smil, *Natural Gas: Fuel for the 21st Century* (West Sussex, UK: John Wiley and Sons, 2015).

collapse of heavy industry in the northeastern United States. During the 1980s, a conservative backlash gained momentum against federal regulation and liberal social movements, including environmentalism. Within this national context, state and local governments attempted a measure of regional control over the benefits and impact of drilling. Another important factor was the physical landscape itself. In western Pennsylvania and the surrounding Appalachian region, drilling occurred in terrain that contained the wells and pipelines of over a century of gas and oil extraction. This drilling activity was further interlayered with the effects of two centuries of coal mining, farming, urban and suburban construction, and other land usage.

In about 2007, a new layer was added to Pennsylvania's energy landscape. A natural gas boom began within the Appalachian regions of Pennsylvania, as well as Ohio, West Virginia and New York. These states sit above the enormous reserves of natural gas in the Marcellus shale formation. The boom happened when new technologies coincided with a geological revelation. In the early 2000s, two companies—Mitchell Energy and Devon Energy—successfully developed an efficient method of releasing natural gas from the previously uneconomical 'tight' shale of the Barnett formation in Texas. Then, Pennsylvania State University professor Terry Engelder, an expert on Appalachian geology, released his calculations of the vast potential reserves of gas in the Marcellus formation, now recoverable with the new technique. Engelder identified the Marcellus as a "super giant gas field," capable of annually producing nearly twice the gas of the then-current output from all of North America.[5]

Marcellus shale rock, and the methane gas within its pores, was formed from the compressed mud and anaerobically decomposed plants of shallow Devonian seas about 400

[5] Terry Engelder, Penn State Home Page, accessed October 11, 2018, http://www3.geosc.psu.edu/~jte2/.

million years ago. The depth of the formation—up to nine thousand feet below the surface—and the low permeability characteristic of Marcellus shale had made it a limited and uneconomical source of gas to obtain by conventional means. Conventional wells are drilled into relatively shallow reservoirs of gas that seep naturally out of more porous rock and accumulate in pockets beneath capstone rock layers. Two relatively new technologies made drilling for tight shale gas practical. They are horizontal drilling, in which the well bore bends from vertical to horizontal to follow the rock seam, and hydraulic fracturing, known as fracking, in which liquid pumped into the well at very high pressure fractures the rock and releases more gas.[6]

Fracking for gas carries negative environmental consequences for surface biota, the human community, and the water vital to both. In the regions where gas companies frack, the construction of roads and pipelines causes forest fragmentation and habitat loss for sensitive wildlife. Many aspects of drilling affect people living nearby, including the noise from high-pressure pumps and seismic blasting, the dust and degraded roads from heavy truck traffic, and exposure to toxic pollutants. Communities are affected by the characteristic social problems of boomtowns, such as housing shortages, increased crime, contraction of other industries, and overstrained social services and facilities.[7] The impact of fracking on ground and surface water is cause for great concern. Each well requires approximately five million gallons of water to make 'slick water' fracking fluid—a mixture of water, sand, and many potentially hazardous chemicals. Once underground, fracking fluid can accumulate salts and radioactive material. As the fluid returns to

---

[6] Brian Black and Marcy Ladson, "The Legacy of Extraction: Reading Patterns and Ethics in Pennsylvania's Landscape of Energy," *Pennsylvania History: A Journal of Mid-Atlantic Studies* 79, no. 4 (2012): 385.

[7]For an in-depth discussion of these effects, see Shanti Gamper-Rabindran, "Mixed Fortunes: The Risks and Rewards of Developing Shale Gas," *The Shale Dilemma: A Global Perspective on Fracking and Shale Development* ed. Shanti Gamper-Rabindran (Pittsburgh: University of Pittsburgh Press), 33-69.

the surface, it can contaminate groundwater and wells. Used fluid is often stored in huge holding ponds subject to leaks that pollute lakes and streams, or sent to municipal water treatment plants ill-equipped to cope with cleaning it.[8] All these environmental problems make fracking very controversial.

Nevertheless, natural gas use may have advantages as a clean-burning bridge fuel while alternative sustainable sources develop. Natural gas is the cleanest fossil fuel to burn because it is composed mainly of methane, the simplest compound among the class of hydrocarbons called alkanes. It contains no sulfur, the cause of acid rain. Burning gas produces almost no soot. Perhaps most importantly, it emits far less climate-changing carbon dioxide than oil or coal.[9] Gas is convenient to use—flexible and adaptable for many purposes. With sufficient infrastructure, it can be easily stored and transported. At normal pressure and temperature, gas does not have the energy density of solid and liquid fuels. This is not an insurmountable drawback except for use in vehicles, for which gas must be condensed or liquefied. For most purposes, adequate pipelines carry high volumes of gas long distances at relatively low cost. Historian Vaclav Smil argues that the next global energy transition will be the replacement of petroleum and coal with natural gas. Smil predicts (contrary to some popular and hopeful narratives) that renewable energy and non-carbon fuels will not be able to supply the bulk of the world's energy for some time to come. Most renewable energy at present is hydroelectric (about eight or nine percent of total energy usage), and dams come with their own set of environmental and social problems. Despite real advances in

---

[8] Black and Ladson, "Legacy of Extraction," 386.

[9] This advantage may be cancelled out by the heat-trapping effects of methane leaks into the atmosphere—methane is a much more potent greenhouse gas than carbon dioxide. The amount of methane leakage from drilling activity is currently debated, see Gamper-Rabindram, "Mixed Fortunes," 65.

renewable energy technologies, power from wind, geothermal, and solar sources comprise only two percent of the world's energy use. Sustainable sources are gaining in importance, but assuming Smil is correct about the timeframe for that transition, natural gas appears to be a better choice than coal or crude oil for immediate needs.[10]

Like other fossil hydrocarbons, gas was most probably produced by anaerobically decomposed biomass that was subjected to high heat and intense pressure underground. These underground conditions were created by a series of collisions between continental plates, which formed the Appalachian Mountains.[11] This geological history made the Appalachians into a vast treasury of fossil fuel energy—not just gas. For two and a half centuries, coal, oil, and natural gas have played a major role in settlement and development in these mountains—nowhere more than in western Pennsylvania. Especially after the mid-nineteenth century, Pittsburgh became the national center of heavy industry, which stimulated the extraction of fossil fuel. The Marcellus gas boom happened in a landscape that already bore the physical effects of centuries of extraction. By the beginning of the Marcellus phenomenon, many thousands of conventional gas wells already existed in the state—possibly three hundred thousand by the late 1980s, the number increasing by one thousand to two thousand new wells each year.[12] The pump was primed.

---

[10] Smil, *Natural Gas,* Preface.

[11] Ibid., 4, 13-14; For information on Appalachian geology: United States Department of the Interior, U. S. Geological Survey Energy Resources Program, "Appalachian Basin Overview," last modified December 14, 2015, https://energy.usgs.gov/RegionalStudies/AppalachianBasin/TabId/127/PgrID/4391/PageID/2/Default.aspx#377211-overview.

[12] David A. Waples, *The Natural Gas Industry in Appalachia: A History from the First Discovery to the Maturity of the Industry* (Jefferson, North Carolina: McFarland, 2005), 223.

1.2 Natural Gas Regulation, Environmentalism, and the Energy Crisis

Earlier drilling caused pollution that prompted legislation to protect the environment. Pennsylvania first enacted bills in the late nineteenth century to mandate the plugging of exhausted 'orphan wells' to prevent methane gas seepage that had caused explosions, and to protect the state's waterways from pollution caused by drilling.[13] In 1984, the Pennsylvania legislature passed the Oil and Gas Act, which created an Oil and Gas Technical Advisory Board. The Act specified requirements for bonding, permitting, reporting, and inspecting gas wells. It set rules for safety, storage reservoirs, well casings, and distances from wells to other structures and property lines.[14] But the process of developing state policy for the industry did not happen in a vacuum. In the late 1960s and 1970s, a number of national and international events had a major impact on Pennsylvania's gas industry. These events included the birth of the modern environmental movement, the nearly simultaneous energy crisis, and the consequent changes in federal gas policy.

Environmentalism was one of the important social movements that gained prominence in the 1960 and 1970s. Americans became more aware of threats to the environment at the same time as their increased mobility and leisure time resulted in growing interest in the protection of unspoiled wild spaces for recreation. They read such publications as Rachel Carson's *Silent Spring* on the dangers of pesticides, and Paul Erlich's *The Population Bomb* on a looming Malthusian crisis. The environmental problems of suburban sprawl were becoming more and more evident. In

---

[13] Julie Grant, "Historian Makes Case," The Allegheny Front, accessed February 19, 2019, http://www.alleghenyfront.org/story/historian-makes-case-tougher-fracking-laws-pa#sthash.SlxBnVCr.dpuf.

[14] The General Assembly of Pennsylvania, Senate Bill No. 402, Session of 1983, accessed February 24, 2014, http://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?syear=1983&sind=0&body=S&type=B&bn=0402.

1968, a major oil spill off the coast of Santa Barbara, California, dramatically reinforced these concerns. For the first time, major news outlets printed and broadcast pictures of oil-soaked birds and animals dying on a ruined beach. That same year, the highly-polluted Cuyahoga River caught fire where it ran through Cleveland, Ohio, into Lake Erie. The growing national environmental consciousness culminated in the first Earth Day in April 1970, a national 'teach-in' that involved tens of thousands of grass-roots participants. National concern over pollution problems resulted in landmark legislation such as the National Environmental Policy Act of 1970, which established the federal Environmental Protection Agency. Individual states also acted. Pennsylvania's legislature passed an amendment to its constitution that established citizens' fundamental right to a decent environment. Environmental consciousness motivated a shifting attitude toward extractive industries.

Just three years after the first Earth Day, the 1973 energy crisis made resource scarcity a major national concern that dominated the decade. The problem of natural gas scarcity in the populated and industrial northeast prompted federal deregulation of natural gas prices in order to incentivize more drilling. Price deregulation and rising demand led to a significant increase in gas drilling in Pennsylvania during the late 1970s and early 1980s.[15] That leasing and drilling boom generated environmental and social concerns, which resulted in the state regulation that was in place when geologist Terry Engelder published his conclusions on the potential of the Marcellus play. Nevertheless, the regulatory and cultural climate in Pennsylvania remained mostly favorable to the drilling industry, despite a long collective experience with the impact of energy extraction of all types. The state's Oil and Gas Act was not passed until well into the Reagan administration,

[15] Those were the circumstances and timing that led to the gas lease on our farm.

when petroleum had become more cheap and plentiful. Voters had rejected President Jimmy Carter's call for an energy policy based on limits and restraint. The national mood had changed. The Act was better than no regulation, but still not very restrictive.

1.3 The Case Studies: Rural and Urban Spaces, Public and Private Land

This dissertation examines the history of natural gas during the latter third of the twentieth century in three areas of Pennsylvania: the northwest corner of the state that borders Lake Erie, the rural Appalachian countryside, and the urban and suburban landscapes of the metropolitan Pittsburgh region. Each case study illustrates the enormous difficulty of devising a sound energy policy, given the number of stakeholders and their complicated goals and motives. Among the sources of conflict over gas policy in these case studies, surface and mineral rights ownership, especially whether ownership was public or private, was a key variable that influenced whether or not stakeholders supported or resisted gas extraction and its regulation. Where the surface was owned by private citizens, or controlled by local leaders who treated municipal land much like private property, Pennsylvanians were apt to defend drilling as part of their private property rights. This was the case on farm land, and in the city of Erie. On the other hand, citizens and community leaders were more inclined to object to drilling on nearby public land. In the examples of Erie's lakebed and the Allegheny National Forest, citizens strongly objected to drilling and called for better state control of the industry. However, the picture is more complicated in the Pittsburgh metropole, where the public/private distinction breaks down. Multiple layers of the effects of past extraction and accumulated infrastructure lay under the region, long pre-dating current land

ownership and uses. Especially concerning pipelines, the law of eminent domain has abrogated private property rights.

The first case study, Chapter two, describes gas infrastructure as one of the many layers in the built environment of southwestern Pennsylvania. Gas use was historically viewed as beneficial. It was associated with clean air, a major issue to a degree not found in other parts of the state. Whenever gas supplies were reliable, it was the preferred fuel for industrial and domestic use. When the first gas boom in the Pittsburgh metropole ended in the late nineteenth century, extensive pipelines began to transport gas, first from the counties surrounding the city, and eventually from the American southwest. Gas suppliers also built storage facilities to help meet demand. However, as the gas infrastructure aged, it became more hazardous. In addition, as the city expanded, more people lived near aging gas workings. Despite the dangers, gas infrastructure remained fairly invisible to the residents who lived near it, a situation the gas industry encouraged. Existing infrastructure both complicated and facilitated the success of the twenty-first century Pennsylvania gas boom.

Chapters three and four concern gas drilling in Erie, the gas-rich northwestern corner of the state. Chapter three describes the controversy over whether or not to drill for gas in the bed of Lake Erie during the beginning of the modern environmental movement. In this case, drilling in the lakebed was actually drilling public 'land.' The city of Erie, which owed its historic identity to the lake, was struggling economically and wanted to capitalize on the growing economic possibilities of the tourist industry on its shoreline. However, the state owned the lakebed area in question, and Pennsylvania State Secretary of Forests and Waters Maurice Goddard wanted the gas revenue to support the development of state parks. The United States Army Corps of Engineers, a federal agency, was charged with assessing the environmental impact of drilling the

lakebed, and had control of the permitting process if the project went forward. In the end, a multi-state consortium of governors prevented drilling in Lake Erie.[16] These events show the dynamic between federal, state and local power and priorities, all of which influenced the legal framework that was in place when the Marcellus gas boom began.

Chapter four involves gas drilling on land in the city of Erie and the surrounding region. It examines the consequences of the 1970s energy crisis and natural gas shortages on the municipality and its citizens. During the energy crisis, amid growing poverty in the deindustrializing northeast, struggling municipalities and citizens drilled 'back-yard' gas wells. While some actors resisted any attempt to limit their ability to extract gas for themselves, others worried about the implications of wells within the built urban environment, and looked to the state to regulate local extraction. Individuals like those in Erie who wintered in the snow belt appealed to the federal government for relief from prohibitively expensive heating costs. Municipal and private organizations such as the public school system, the water authority, the zoo, and even a local convent drilled their own wells right in town, a real reversal from the public position on gas wells in the lake. Like the fight over drilling the lake, these events were factors in the evolution of key federal and state laws regulating gas, which were still in place forty years later. However, this case demonstrates the on-going commitment to private property rights—the right to capitalize on resources under personal control. It also shows the how the energy crisis reinforced the desirability of gas extraction as a public good, another factor that kept the regulatory climate in Pennsylvania friendly to the gas industry.

[16] Lake Erie's Canadian waters contain oil and gas wells, but there are none on the American side of the lake.

Chapters five and six involve gas drilling in rural Appalachia, again looking at the differences between drilling on private versus public land. As in the case of Erie, protests against drilling, and calls for better regulation, were generally stronger in defense of public land. Chapter five looks at the decisions and experiences of Appalachia farmers. Rural landowners have a long history of subsidizing their agricultural income with the sale of mineral rights. That tradition, combined with the defense of their private property rights, and the need for cheap energy for their own enterprises, have all fostered famers' inclination to cooperate with the natural gas industry. Nevertheless, they were also sensitive to possible environmental degradation. Many rural landowners who signed gas leases at the beginning of the Marcellus boom were acting on awareness that farmers had done so in the 1980s, apparently with no really adverse consequences. The possible impact of gas extraction looked benign, especially when compared to the legacy of coal.

Chapter six shows that the situation was different in the case of gas drilling in the Allegheny National Forest (ANF). The many preexisting gas leases and wells in the large track of northwestern Pennsylvania that became ANF caused conflicting interests between subsurface private property rights and the public use of the surface as wild land. Federal park personnel, acting on legal precedent, prioritized sub-surface rights over surface use. Environmental advocates pushed for better protection for the wilderness from the gas industry. In the 1980s, the Western Pennsylvania branch of the influential Sierra Club focused its energies on wilderness preservation, not on policy for an environmentally-sound use of working landscapes. The Sierra Club's actions illustrate the classic dichotomy in American environmental thought between the utilitarian model

of 'wise use' resource conservation, and the deep ecology model of wilderness preservation.[17] This polarized habit of mind concerning energy extraction is with us still, nowhere more than in the debate over the benefits and problems of fracking for natural gas.

This dissertation contributes to regional studies of working landscapes and the people in them. It is also situated in scholarship on unconventional activists, those who have a personal stake in protecting their environment, but do not identify with the stereotypically white, middle-class, urban and suburban activists that join mainstream environmental organizations. My work joins other central Appalachian histories that explore these subjects, many of which examine the pivotal role of energy extraction in shaping regional history.[18] However, for the most part, this energy scholarship is focused on coal mining and oil drilling. The history of natural gas sometimes appears as an adjunct to the history of oil, in part because petroleum was viewed as more important than natural gas throughout much of the twentieth century. That view has changed, and natural gas is well worth examining in its own right, especially as it becomes more important as an energy source.

My work is focused on the less-studied social and environmental impact of natural gas extraction in the latter half of the twentieth-century. Stories of the current natural gas boom that

---

[17] More than twenty years ago, William Cronan exposed the fundamental problems of the conservation/preservation polarization in environmental thought, a legacy of progressive-era politics, in "The Trouble with Wilderness," William Cronan, ed. *Uncommon Ground: Rethinking the Human Place in Nature* (New York: W. W. Norton & Company, 1996), 69-90.

[18] Shirley Stewart Burns, *Bringing Down the Mountains: The Impact of Mountaintop Removal on Southern West Virginia Communities* (West Virginia University Press, 2007); Chad Montrie, *To Save the Land and People: A History of Opposition to Surface Coal Mining in Appalachia* (University of North Carolina Press, 2003); James Longhurst, *Citizen Environmentalists* (Lebanon, New Hampshire: University Press of New England, Tufts University Press, 2010); Allen Dieterich-Ward, *Beyond Rust: Metropolitan Pittsburgh and the Fate of Industrial America* (Philadelphia: University of Pennsylvania Press, 2016); Joseph Pratt, Martin Melosi, and Kathleen Brosnan, eds., *Energy Capitals: Local Impact, Global Influence* (Pittsburgh University Press, 2014); Brian Black, *Petrolia: The Landscape of America's First Oil Boom* (Baltimore: Johns Hopkins University Press, 2000).

center on people and landscape are proliferating in both popular and scholarly work. Authors of popular books describe the impact of the new drilling boom on people in Appalachian regions.[19] Others show the gas boom in national and international context.[20] Researchers also focus on the social effects of the new fracking technology.[21] Major newspapers dedicate special sections to coverage of gas drilling.[22] Josh Fox's 2010 documentary film Gasland, in which the resident of a Pennsylvania gas field famously set the water coming from his kitchen tap on fire, has aroused considerable controversy. [23] By contrast, the academic literature of twentieth-century natural gas history neglects the impact of gas extraction on people and the environment. The historiography is dominated by the problems of federal price controls, even in the case of the only work extant specifically on Appalachian gas. [24] Vaclav Smil, arguably the most respected and prolific historian

---

[19] Tom Wilber, *Under the Surface: Fracking, Fortunes, and the Fate of the Marcellus Shale* (Cornell University Press, 2012); Seamus McGraw, *The End of Country: Dispatches from the Frack Zone* (New York: Random House, 2011).

[20]Russell Gold, *The Boom: How Fracking Ignited the American Energy Revolution and Changed the World* (New York: Simon & Schuster, 2015); Gary Sernovitz, *The Green and the Black: The Complete Story of the Shale Revolution, the Fight over Fracking, and the Future of Energy* (New York: St. Martin's Press, 2016); Shanti Gamper-Rabindram, ed., *The Shale Dilemma: A Global Perspective on Fracking & Shale Development* (Pittsburgh University Press, 2018).

[21] For the impact on jobs, community infrastructure and services, and quality of life, see Northeast Regional Center for Rural Development, "Boomtowns and Natural Gas: Implications for Marcellus Shale Local Governments and Rural Communities," ed. Jeffrey Jaquet, Pennsylvania State University: NERCRD Rural Development Paper no. 43, Pennsylvania State University, January 2009, accessed March 25, 2012, http://www.nercrd.psu.edu. For health impacts, see Simona L. Perry, "Using Ethnography to Monitor the Community Health Implications of Onshore Unconventional Oil and Gas Developments: Examples from Pennsylvania's Marcellus Shale," *New Solutions: Scientific Solutions* 23 no. 1 (2013): 33-53.

[22] The New York Times publishes the *Drilling Down* series to "examine the risks of natural gas drilling and efforts to regulate this rapidly growing industry," http://www.nytimes.com/interactive/us/DRILLING_DOWN_SERIES.html. The Pittsburgh Post-Gazette features the award-winning *Pipeline*, "Your source for Marcellus Shale coverage and community," http://pipeline.post-gazette.com/.

[23] *Gasland*, directed by Josh Fox (New York: Video Group, 2010).

[24] Richard H. K. Vietor, *Energy Policy in America Since 1945: A Study of Business-Government Relations* (Cambridge University Press, 1984); Arlon R. Tussing and Connie C. Barlow, *The Natural Gas Industry: Evolution, Structure, and Economics* (Cambridge, Massachusetts: Ballinger Publishing Company, 1984); Michael Graetz, *The*

of energy, takes a very broad approach to the issues of natural gas. Vaclav's work is extremely valuable for understanding the global implications of Pennsylvania's gas resources, but it perforce neglects the relationship between the global and the local.[25] My study shows the agency of regional actors within the context of federal and state policy. It shows the importance of scale in obtaining a nuanced understanding of the actions of different stakeholders. A close-up view offsets the danger of reaching conclusions through an ecological fallacy, an analysis that draws skewed inferences about individuals from aggregated data—sometimes called "aggregation bias."[26] In short, my work looks at understudied individuals and places in Pennsylvania during a period that set the institutional, legal, and social framework that facilitated the Marcellus Shale boom of the early twenty-first century.

There is another type of literature that has influenced my research on the history of energy, especially in considering the individual, and who benefited and who payed along the way—writings on the ethics of extraction. Not all this literature is academic. This past year we lost Ursula K. Le Guin, a particularly insightful writer and commenter on what makes an ethical life. One of her best-known stories, which I first read in high school, was "The Ones Who Walk Away from

---

End of Energy: The Unmaking of America's Environment, Security, and Independence (Cambridge: Massachusetts Institute of Technology Press, 2011). Waples, *The Natural Gas Industry in Appalachia: A History from the First Discovery to the Maturity of the Industry* (Jefferson, North Carolina: McFarland and Company, 2005).

[25] Among many other works, Vaclav Smil has published *Energy in World History* (Boulder, Colorado: Westview Press, 1994), *Energy and Civilization: A History* (Massachusetts Institute of Technology Press, 2017), and *Natural Gas: Fuel for the 21st Century* (West Sussex: John Wiley & Sons, 2015).

[26] "Aggregate data are often easier to obtain than data on individuals, and may offer valuable clues about individual behavior. Ecological inferences will therefore continue to be made. The problems of confounding and aggregation bias, however, are unlikely to be resolved in the proximate future." David A. Freedman, "Ecological Inference and the Ecological Fallacy," *International Encyclopedia of the Social & Behavioral Sciences,* Technical Report No. 549, 15 October 1999, p 5. https://web.stanford.edu/class/ed260/freedman549.pdf. Accessed February 15, 2019.

Omelas."[27] It describes a utopian society that depends for its existence on the misery of one child, doomed to absolute isolation and suffering. The story was framed as science fiction, but it was a conscious expansion on the following quotation from the nineteenth-century pragmatist philosopher and psychologist William James:

> Or if the hypothesis were offered us of a world in which Messrs. Fourier's and Belamy's and Morris's utopias should all be outdone, and millions kept permanently happy on the one simple condition that a certain lost soul on the far-off edge of things should lead a life of lonely torment, what except a specifical and independent sort of emotion can it be which would make us immediately feel, even though an impulse arose within us to clutch at the happiness so offered, how hideous a thing would be its enjoyment when deliberately accepted as the fruit of such a bargain?
>
> --William James, "The Moral Philosopher and the Moral Life"

Le Guin's story is about the classic question of what people are willing to pay for what they want. It asks who benefits and who suffers in the support of a particular social order. Those questions are the germ of the debate over exploitation generally, but certainly apply to the fracking controversy: Who gets rich, and who just gets the headaches? What sacrifice is exacted from a particular region's human and non-human life, certainly to make some enormously wealthy, and to power modern civilization as we know it, but also to mitigate—to some degree—planetary climate disaster? Many stakeholders connected with natural gas extraction have argued that it is possible to do it right, or at least right enough, without creating social and environmental sacrifice zones. Possibly. The effort to do so requires as complete a knowledge of the situation as possible,

---

[27] Ursula K. Le Guin, "The Ones Who Walk Away from Omelas (Variations on a theme by William James)," *The Real and the Unreal: The Selected Short Stories of Ursula K. Le Guin* (New York: Saga Press, 2016), 329-336.

including how previous attempts have played out. It is hugely important to understand the context and contingencies that have resulted in our current system, in order to inform energy choices going forward.

2.0 Palimpsest: Natural Gas and Southwestern Pennsylvania's Energy Landscape

The citizens of western Pennsylvania live, work and travel amid a huge conglomeration of natural gas infrastructure—hundreds of thousands of wells, both active and abandoned, extensive underground storage facilities, and thousands of miles of pipeline. Inevitably, the presence of so much gas and its infrastructure leads to bad accidents: leaks, explosions and fires. Nevertheless, the sources of these hazards are often either unknown or generally disregarded by the people who live near them. The danger has not impeded the current gas boom. On the contrary, Russell Gold, senior energy reporter for the Wall Street Journal, stated that the extensive pre-existing natural gas infrastructure was a major factor in making unconventional gas drilling such a success in Pennsylvania's Marcellus region, more so than in other places with similar geologic potential.[28] Preexisting gas infrastructure facilitated the Marcellus boom, but what facilitated the infrastructure, an integral part of Pennsylvania's built landscape? This chapter examines how the complicated legacy of fossil fuel extraction, in combination with other rural and urban land uses, affected the gas industry and the people who lived near its works in the city and countryside of Pittsburgh's metropole.[29]

---

[28] Russell Gold, *The Boom.* Gold made the statement to NPR's Neal Conan on "Politics of Oil" *Truth, Politics and Power*, Episode 49, March 2, 2018. https://truthpoliticsandpower.org/politics-of-oil/.

[29] For a thorough and concise discussion of the history and relationships of Pittsburgh's natural and built landscapes, see *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region*, ed. Joel A. Tarr (University of Pittsburgh Press, 2004), particularly Edward K. Muller and Joel A. Tarr, "The Interaction of Natural and Built Environments in the Pittsburgh Landscape," p. 11-40.

The natural gas industry contributes to most Pennsylvanians' lack of awareness about the concentration of gas infrastructure under their feet, in part by keeping the location of most pipelines confidential. According to the United States Department of Transportation's Pipeline and Hazardous Materials Safety Administration, there are 89,296 miles of natural gas pipelines in Pennsylvania. Of these, only eleven percent are mapped. Federal law only requires that the location of large transmission lines be available to the public. The law does not require the gas industry to disclose the location of the rest, which include about a thousand miles of medium-sized lines that gather gas from wells, and the large remainder that consists of smaller lines that supply gas to homes and businesses. The leaking pipeline that caused an explosion in Beaver County on September 10, 2018—which destroyed a house, shut down a section of I-376, and caused numerous families to evacuate at a moment's notice—was an unmapped gathering line.[30] But would wider knowledge of the line have made any difference to the safety of those residents?

Another recent dramatic and catastrophic event, in this case involving a large mapped transmission line, illustrates the dangers associated with the proximity of natural gas infrastructure to residents of western Pennsylvania. On April 29, 2016, a fireball exploded along Route 22 in Westmoreland County, just east of Pittsburgh. One man was badly burned while trying to escape the fire. The explosion destroyed one house and damaged several others. The road next to the intense fire buckled and melted, but luckily no passing vehicles were caught in the blast. This pipeline leak explosion probably resulted from one or more corroded welds. The major failure occurred despite regularly scheduled inspections, although the last one occurred in 2012. The

---

[30] Davis, "Only 11 Percent"; Susan Philips and Reid Frazier, "Natural Gas Pipeline Blast in Beaver County Prompts Evacuation," National Public Radio: State Impact Pennsylvania, September 10, 2018. https://stateimpact.npr.org/pennsylvania/2018/09/10/natural-gas-pipeline-blast-in-beaver-county-prompts-evacuation/.

vicinity of the explosion contains a lot of natural gas infrastructure, including a compressor station to process gas, a thirty-nine square mile subterranean storage field with about one hundred injection and monitoring wells, and at least four other pipelines. Some older residents of the neighborhood had long worried about the potential dangers of living so near a major gas supply. Fortunately, precautionary measures to prevent the spread of the fire were successful. The pipeline involved is a large interstate line, built by the Texas Eastern Corporation in 1981. It carries a significant amount of gas—enough that the explosion and interruption in service had a noticeable impact on national gas trading and prices. Westmoreland County is not unique among Pennsylvania counties in the amount of natural gas infrastructure built in and under it, especially since the 1950s. Texas Eastern alone owns about 9,000 miles of pipeline, 2,000 miles of it in Pennsylvania.[31]

The extent of the accumulated infrastructure is not really surprising; Pennsylvania has been "ground zero" for American fossil fuel extraction for the last one hundred and fifty years. Pennsylvania coal powered nineteenth-century industrial development. The first oil well was drilled in the state, leading the way for the twentieth century addiction to petroleum. Hundreds of thousands of conventional gas wells exist, some dating as far back as the eighteenth century. The twenty-first century Marcellus shale natural gas boom has affected energy markets on a global scale. These successive phases of energy extraction are written into the landscape of Pennsylvania, and the greater Pittsburgh region is an especially rich part of that text. The coal, petroleum and

[31] Anya Litvak, "Natural Gas Well Explosion in Westmoreland County," *Pittsburgh Post-Gazette*, April 29, 2016; Don Hopey, "Westmoreland Residents Worried About Effects of Pipeline Explosion," *Pittsburgh Post-Gazette*, May 11, 2016.

natural gas industries co-evolved, and overlapped in time and space. Each continued to affect subsequent energy-related activity.[32]

The legacies of resource extraction, especially coal mines and natural gas wells, are interlayered with rural and urban settlement. The abundant energy sources concentrated under the hills of middle Appalachia had a fundamental impact on the settlement and development of southwestern Pennsylvania. The wealth of energy was a primary factor in the industrial development that drew hundreds of thousands of people to the region.[33] Those layers of development and settlement form a palimpsest. Geographers have repurposed that term, which originally meant a piece of reused writing material on which the current text overlays older and partially obliterated script. As geographer Jasper Knight summarizes, ". . . palimpsest landscapes are multidimensional expressions of physical and human processes, which is one reason why they are so interesting to study." The effect of multiple layers of extraction, especially in close proximity to other rural and urban land uses, continues to complicate the production of energy, as well as the business of living generally. The problems of the aging infrastructure and abandoned workings of the natural gas industry, often in conjunction with the legacy of coal, have made life more dangerous for western Pennsylvanians. Nevertheless, people in the region have become accustomed to living around, above, and near fossil fuels. That gradual and long-term process of

---

[32] Black and Ladson, "The Legacy of Extraction," 377; Pratt, Melosi and Brosnan, *Energy Capitals,* xi. This collection of essays concerns places that have been more intensely involved with fossil fuel energy than others; to a greater degree they have been shaped by its production and use. It includes Pittsburgh as one of the cities that played an especially important role in global energy production, and was itself shaped by that role. Joel A. Tarr and Karen Clay, "Pittsburgh as an Energy Capital," *Energy Capitals: Local Impact, Global Influence,* Joseph A Pratt, Martin V. Melosi and Kathleen A. Brosnan, eds. (University of Pittsburgh Press, 2014), 5-29. Tarr and Clay argue persuasively that the most significant events of energy history in southwestern Pennsylvania have been the transitions between the use of coal and the use of natural gas. The authors use these transitions as a framework for the regional history of coal and gas, and their economic, social, and environmental impacts on the Pittsburgh area. Their study of energy transitions—broad structural changes in the use of energy—also reveals the persistence of multiple types of energy extraction and use in every period.

[33] Tarr and Muller, *Devastation and Renewal*.

normalization, amid the accumulated built environment of energy extraction, was part of the structure in place when the Marcellus gas boom developed. The palimpsest is a text in which one can read the history of how the physical structure of the natural gas industry evolved in the context of all fossil fuel extraction and use.[34]

Fracking for natural gas in Pennsylvania's Marcellus play may be new, but gas drilling has a long history in the state, and has always been layered with other types of carbon energy extraction. Coal was the principal fuel of the industrial nineteenth century, and addiction to petroleum characterized the twentieth century. The gas industry predates the region's nineteenth-century petroleum boom, and has outlasted much of its coal-based heavy industry. The share that each type of hydrocarbon contributes to global energy use changes, but their usage and technology co-evolved. The history of the gas industry in southwestern Pennsylvania, from its earliest days, demonstrates some of the tight connections between different types of resource extraction, which have resulted in the complicated and problematic legacy of natural gas. The infrastructure involved in the April 2016 blast was in place long before the hazards of fracking prompted a wealth of publicity on the subject. The results of more than a century of accumulated gas industry activity lie under the houses and roads of Westmoreland County, affected by other extractive industries all along the way.

In this chapter, a series of examples show the co-evolution of gas, petroleum and coal in a shared landscape, from the eighteenth to the twentieth centuries. This evolution was punctuated

---

[34] Definition of 'palimpsest:' "A manuscript or piece of writing material on which later writing has been superimposed on effaced earlier writing. Something reused or altered but still bearing visible traces of its earlier form." English Oxford Living Dictionaries, Oxford University Press, (2016), https://en.oxforddictionaries.com/definition/palimpsest; Jasper Knight, "Development of Palimpsest Landscapes," *Vignettes: Key Concepts in Geomorphology*, The Science Education and Research Center at Carlton College, last modified November 15, 2016, http://serc.carleton.edu/vignettes/collection/67822.html. Knight provides a useful and succinct explanation of how physical geographers use the word palimpsest.

by a number of disasters, which nevertheless failed to ultimately discourage the expansion of gas industry infrastructure. In Pennsylvania during the late eighteenth and early nineteenth centuries, gas was a local resource for domestic and early manufacturing use. Salt-making in particular was associated with natural gas drilling. Coal miners began to accumulate information about fossil fuel geology that expanded knowledge of new gas fields. During the late nineteenth century, the first petroleum boom further stimulated the discovery of productive gas fields and helped develop the technology of commercial gas pipelines. The availability of natural gas in industrial quantities made it attractive to Pittsburgh's heavy industry, creating demand which further encouraged construction and refinement of gas delivery technology. At the turn of the twentieth century, rapid exhaustion of shallow gas wells made gas storage structures increasingly necessary, even after most heavy industry returned to coal. At mid-century, the importance of petroleum to national security favored pipeline construction, which benefited the gas industry as well. The energy crisis of the 1970s also stimulated well-drilling and pipeline expansion. Suburban sprawl after World War II brought a new generation of Pennsylvanians into proximity with the accumulated effects of energy extraction. Each of these developments caused accidents and loss of life. Nevertheless, at the end of the twentieth century, many Pennsylvanians remained relatively unconscious of, or indifferent to, the hazards from past and present extraction—virtual land-mines under their feet.

2.1 Nineteenth-Century Brine, Petroleum, Coal, and Natural Gas

Until the first half of the nineteenth century, Appalachian gas remained locally produced and used. It commonly predated the use of petroleum. Eighteenth-century travelers and explorers of the western Pennsylvania mountains like young George Washington reported naturally-

occurring oil and gas seeps, as well as the 'burning springs' long familiar to the original Native American population. Early settlers used gas from local wells for heat, light, and especially for evaporating brine (a concentrated solution of mineral salts obtained from wells since ancient times) to make salt. As the region became more populated, drillers often made gas discoveries accidentally while looking for water or brine. Early brine wells in the Pittsburgh area also produced gas, sometimes with destructive consequences. For example, in 1820, gas leaking from a brine well on the south bank of the Ohio River caused a fire, destroying the entire salt works. In 1830, a 670-foot brine well produced another accidental gas discovery south of the city, next to Saw Mill Run. Similar gas discoveries occurred all around the region, and the local population either deplored or utilized the gas with varying degrees of efficiency. Drillers often simply flared off great quantities of unwanted gas, which they regarded as a waste product. In villages and towns near productive wells, short pipelines made from wood supplied gas for household needs, and powered many early industries in addition to salt-making, such as brass-works; brewing; and brick, soap and lampblack production.[35]

The fledgling nineteenth-century petroleum industry stimulated natural gas usage. Natural gas did not change from a localized fuel to a larger-scale commercial resource until after the nation's first oil boom, which began in western Pennsylvania. In 1859, Edwin Drake drilled the first oil well in Titusville and sparked a black-gold fever that drew tens of thousands of speculators and drillers to the western part of the state. Nearly all oil wells contain some gas; that's what causes a 'gusher.' Citizens in the oil boom towns like Pithole and Oil City made some attempts to use gas for domestic purposes, but more gas was wasted. Gas was burned off or simply allowed to dissipate

[35] Waples, *The Natural Gas Industry*, 5-14. Waples provides a detailed summary of the early history of Appalachian natural gas in his first chapter, "Burning Springs—The Cradle of the Industry."

into the air if the well yielded no oil. The necessary infrastructure and technology needed to control and deliver the gas from the well head to the consumer was missing. However, the expertise gained in the initial attempts to capture and pipe gas to towns in the oil fields eventually led to successful construction of the first pipelines of any significant length and capacity. Credit for the first commercial long-distance gas pipeline goes to the Bloomfield and Rochester Natural Gas Light Company. In 1872, that company constructed a twenty-mile pipeline made of hollowed white pine logs to supply Rochester, New York.[36]

Coal (ironically) played a major role in the developing natural gas industry.[37] The ready availability of coal was one of the key reasons why nineteenth-century Pittsburgh had become an industrial giant. In a self-reinforcing loop, available coal encouraged heavy industry, creating demand for yet more energy. The highly competitive nature of Pittsburgh's industry incentivized the use of natural gas, which became more convenient and economical than coal in the 1870s. In the Pittsburgh area, large-scale use of natural gas began with the extraction of significant supplies from around and under the city itself, and in the nearby countryside. The famous Haymaker gas well, drilled in 1878, supplied natural gas to Pittsburgh from the Murrysville gas field in Westmoreland County, about eighteen miles east of the city. (That was the vicinity of the 2016 explosion.[38]) By the 1870s, iron and steel manufacturers used gas in mills along the Allegheny River. In the 1880s and 1890s some owners of major Pittsburgh industries converted their plants

---

[36] Ibid., 15-19.

[37] The irony is that expansion of the gas industry came at the expense of the coal industry—an improved gas supply translates to less demand for coal. That fact is acutely evident today; Pennsylvania's coal industry is in a severe decline due to competition from cheap, abundant Marcellus shale gas.

[38] Underground gas storage fields were typically in areas containing played-out gas wells. The pockets that had originally held the gas were reused to store gas from other places.

from coal to natural gas, including Pittsburgh Plate Glass, and Andrew Carnegie's Homestead and Edgar Thomson steel mills.

The extraordinary inventor George Westinghouse, involved in many major transportation and energy innovations, played a major part in facilitating gas distribution and improving pipeline technology during the late nineteenth century. His efforts helped expand the domestic use of natural gas in the city. Westinghouse sank a gas well next to his own Pittsburgh residence. Gas from it exploded a short time later and burned for weeks, but he was not deterred. Westinghouse formed the Philadelphia Company, which (despite the name) distributed natural gas to Pittsburgh homes and industries.[39]

2.2 Nineteenth-Century Farmers and Natural Gas

The landscape and history of rural Greene County provides an example of how coal mining and oil drilling helped establish the natural gas industry. The county, located in the southwestern corner of Pennsylvania, about thirty miles south of Pittsburgh, is part of the hinterland that supplied a substantial amount of natural gas to metropolitan Pittsburgh during the late nineteenth and early twentieth centuries. Before natural gas became an important industrial fuel, Greene County had long supplied coal and coke to industries along the Monongahela River valley. The coal came from the high-quality Pittsburgh bituminous coal seam. Miners accumulated important information about the underlying geology of the region, which helped guide and promote the extraction of natural gas. The record of gas drilling in Greene County also illustrates how quickly old workings

[39] Waples, 44.; Tarr and Clay, "Pittsburgh as Energy Capital," 14.

became forgotten or ignored. For better or worse, within the first few decades of commercial drilling, abandoned and forgotten wells became a common part of the Pennsylvania landscape.[40]

Greene County resident Ira D. Garard wrote a memoir about life in the late nineteenth and early twentieth centuries, which present a picture of gas drilling in an established, but not particularly prosperous, farming community. Some farmers supplemented their resources and income with the home use or sale of coal, oil and gas. Shallow coal deposits had supplied local demand decades before serious commercial mining began. According to Garard, the original oil boom of the 1860s that began with Edmond Drake's Titusville well instigated drilling for oil and gas in Greene County. The oil boom prompted exploratory drilling all over western Pennsylvania. At first there was not much method in the selection of well sites. Wildcatters in Greene County like everywhere else were men who gambled on the hit or miss chance of a productive well in new territory.[41] Oil was of primary interest at that time, but oil wells often produced natural gas as well. Concerning natural gas, Garard reported:

> Here and there over the county there was a well with commercial quantities of gas that was piped to the nearest village. The farmer collected a royalty on the gas and free gas to heat and light his house including an outside light, which was of the torch type and which could be seen for miles. But the companies soon saw that they were losing a lot of gas and specified that the outside light had to have a mantle and globe like an inside light.

---

[40] County of Greene, Pennsylvania, "About Greene County Communities, History & Government, Pennsylvania," last modified Feb. 11, 2015, www.co.greene.pa.us/secured/gc2/history/aboutGC.htm.

[41] 'Wildcat' drilling is the sinking of exploratory wells in new untested terrain, in hopes of an eventual payoff.

Garard stressed the importance of commercial development of coal, oil, and gas for bringing in cash that benefited the struggling agricultural economy, beyond the benefits to individual landowners.[42]

Market forces and the expansion of pipeline infrastructure helped promote demand for Greene County gas. The first recorded commercial gas well in the county began production in 1889 near the town of Waynesboro. At that time, uncertain gas supplies near Pittsburgh were already causing the shift back toward industrial coal use. Pittsburgh industries that continued to use gas chose not to relocate near the expanded sources of supply, preferring to transport gas through pipelines to their factories. Individual gas companies built and maintained the pipelines, which mostly supplied Pittsburgh, although some gas was transported to Wheeling, West Virginia, and other Ohio River Valley industrial towns. Gas, when available, was cheaper, cleaner, and more convenient than coal. Private citizens preferred gas for home use as well. These various uses drove increasing demand. However, the early shallow wells quickly ran dry, so constant drilling of new wells was necessary to keep up the supply.[43]

To expand production, the natural gas industry drew upon knowledge gained from the record of earlier wildcat drilling, as well as geological information acquired during decades of coal extraction. In 1907 Ralph G. Stone and Frederick G. Clapp of the United States Geological Survey prepared a document, "The Oil and Gas Fields of Greene County, Pa." as part of the USGS series on economic development and descriptive geology. The authors hoped to present a useful

---

[42] Ira D. Garard, "Greene County, Pennsylvania, 1890-1918," *The Western Pennsylvania Historical Magazine* 63, no. 2 (Apr., 1980): 146.

[43] Ralph W. Stone and Frederick G. Clapp, *Oil and Gas Fields of Greene County, PA*. Department of the Interior, United States Geological Survey, Charles D. Walcott, Director (Washington: Government Printing Office, 1907), 64, 9, accessed April 4, 2016, http://pubs.usgs.gov/bul/0304/report.pdf.

compilation of information to aid drillers in identifying promising new areas. They described the surface strata in various formations throughout the county and the relationship between topography and subsurface geology. They predicted the type of rock formations drillers could expect to encounter, and estimated the depth of productive sands. They constructed maps of named gas fields, which included the known active and exhausted wells that were drilled from the beginning of gas production in Greene County to the time of their survey, roughly between 1890 and 1905. However, the authors acknowledged that the inventory of wells was incomplete. Even in 1905, abandoned wells with the super-structure removed were not easy to find.[44]

Stone and Clapp emphasized the importance of the Pittsburgh coal seam formation in aiding gas exploration. They explained that drillers used the well-known seam as a practical point of reference to identify promising rock strata: "It happens that the Pittsburg (sic) coal, which is at the base of the Monongahela formation, is the lowest easily recognized bed outcropping in the county and is also the stratum used by drillers throughout the county for calculating distances to productive sands." The use of the coal seam as a reference was particularly important because information from previous drillers about the subsurface formations they had encountered was often sketchy or incomplete. The authors indicated the location of all the known productive gas-bearing sandstone formations—the Murphy, Dunkard, Gas, Salt, Big Injun, Thirty-foot, Gantz, Fifty-foot, Nineveh, Gordon, Fourth, Fifth, and Bayard sands—by providing their depth below the Pittsburgh coal seam.[45]

---

[44] Ibid.; In 1905, Pennsylvania was still a major producer of oil, but oil wells in Greene County were not as productive as those in other parts of Pennsylvania. In addition, the 1901 Spindletop oil gusher had already touched off the first Texas oil boom, which began development of the major southwestern oil fields that were to be so vital to the nation's energy supply from then on.

[45] Ibid., 11.

The history of natural gas in Greene County illustrates the palimpsest of natural gas and other fossil fuels interlayered with rural life. Coal mining and oil drilling helped the development of the gas industry, which shows the tight connections of all types of carbon extraction. In Greene County, and southwestern Pennsylvania generally, early gas workings were quickly obscured and effaced; the old text previously written on the landscape was hidden. Wells are not like mines, which leave larger and more visible scars. Those wells remained ignored or forgotten by the people who lived near them. It is reasonable to assume that if rural people had regarded abandoned wells as a particularly serious danger or liability, the USGS researchers would have had less difficulty locating them.

Gas wells became a normal part of rural life. Nevertheless, the disadvantages of natural gas were apparent from the beginning of its commercial use. Oil and gas wells polluted surface and ground waters with wastewater brine, greases and sands. Abandoned 'orphan' wells that lacked proper casing (the well shaft lining) or that were not plugged could continue to leak those pollutants into drinking water supplies. As early as the 1870s, concerns about water pollution prompted efforts at regulation. State legislation required drillers to plug exhausted wells to prevent gas and brine leaks. A few individuals and at least one municipality successfully sued drilling companies, demanding compensation and better management practices after drinking water sources became contaminated. Although enforcement was weak and spotty, the attempt at regulation indicated at least some public awareness of these chronic problems.[46]

---

[46] Joel A. Tarr and Karen Clay, "Pittsburgh as an Energy Capital: Perspectives on Coal and Natural Gas Transitions and the Environment," Joseph Pratt, Martin Melosi, and Kathleen Brosnan, eds., *Energy Capitals: Local Impact, Global Influence* (Pittsburgh University Press, 2014); Black, *Petrolia.*

2.3 Infrastructure: Gas Storage and the 1927 Manchester Explosion

Natural gas transported from the countryside into the heavily-built and crowded city resulted in a different set of acute problems. In the City of Pittsburgh during the early twentieth century, the most frightening and immediate dangers from gas were the numerous explosions, which resulted in destructive fires and loss of life. A contemporary Pittsburgh newspaper editorial titled "Death in the Streets" claimed that natural gas explosions presented a hazard to the city that could only in be exceeded during a war. These explosions were a vivid lesson in the dangers of natural gas transportation, storage, and use in a crowded urban setting, especially as decades went by and the gas infrastructure began to age.[47]

By the 1920s the unreliability of gas supplies from quickly-depleted shallow wells had caused most of Pittsburgh's heavy industry to revert to coal, although domestic demand was still strong.[48] Gas storage systems, although expensive, were necessary to stockpile supplies needed for peak winter demand.[49] In its natural state, gas can be stored underground, often injected into exhausted gas wells, mines or salt domes.[50] Such storage wells were numerous in Appalachia, where the technology was invented and improved. Even more old wells were converted to storage in the region's depleted gas fields when gas began to flow in from the southwest in mid-century.[51]

---

[47] Tarr and Clay, "Pittsburgh as an Energy Capital," 14-17.

[48] Ibid.

[49]In addition to stockpiling gas in its natural state, liquefaction is an important way of storing it. Gas becomes liquid if chilled to very low temperatures, and stored in insulated containers. Liquefied natural gas has only about 1/600 the volume it has in a gaseous state. John Hrastar, *Liquid Natural Gas in the United States: A History,* (Jefferson, North Carolina: McFarland & Co., 2014).

[50] Tussing and Barlow, 1, 28, 61, 102, 233.

[51] Waples, 84, 131.

In urban areas, gas was sometimes stored in a constructed tank, similar to a civic water tower. That storage method was abandoned as unsafe, after a 1927 tragedy that occurred in Pittsburgh.

A catastrophic explosion occurred on November 14, 1927, in Pittsburgh's North Side neighborhood of Manchester, part of old Allegheny City. The blast originated in two large Equitable Gas Company storage tanks located at the corner of Reedsdale and Fontella Streets. Residents and local organizations initially objected to the construction of the tanks as hazardous, but city authorities permitted the tanks based on the safety record of similar gas storage units. Nevertheless, local property values had subsequently suffered because of the perceived threat to nearby people and buildings. The concerns were unfortunately justified when the tank blew sky-high, and took a sizeable chunk of the neighborhood with it. Later investigation reports blamed the explosion on an attempted repair to an ostensibly empty tank, by a workman using an acetylene torch. Evidently enough gas remained to ignite.[52]

The destruction was enormous. The disaster took the lives of twenty-six people, including the workmen on the repair job; another 465 were treated at local hospitals. The damage to surrounding homes and businesses was estimated at that time to be about five million dollars.[53] Streets heaved and buildings collapsed into rubble that did resemble the aftermath of a bomb blast. Buildings within a half mile radius were mostly leveled, and windows broke and plaster cracked in structures as far as six miles away. Broken water and sewer mains flooded some streets. A

---

[52] Allegheny Centennial Committee, Writers' Program of the Works Progress Administration in the Commonwealth of Pennsylvania, *Story of Old Allegheny City* (Pittsburgh: Allegheny Centennial Committee, 1941), 112-113, http://digital.library.pitt.edu/cgi-bin/t/text/text-idx?idno=00ace7952m;view=toc;c=pitttext. A recent brief account of the disaster is Len Barcousky, "Eyewitness 1927: Big Bang Hammers North Side Hard," *Pittsburgh Post-Gazette,* Nov. 13, 2011, http://www.post-gazette.com/local/community-eyewitness/2011/11/13/Eyewitness-1927-Big-bang-hammers-North-Side-hard/stories/201111130196.

[53]Five million dollars in 1927 is equivalent to almost two hundred million dollars today.

weather bureau located about one mile from the blast reported that tremors similar to an earthquake shook the area, and the noise of the explosion carried for fifteen to twenty miles. A fireball emerged from the smoke and dust, and rose a thousand feet into the air. The Pittsburgh Post-Gazette recounted the experiences of some survivors:

> "The floor seemed to lift and I was thrown into the yard," Louise Chamay, who lived on Reedsdale Street, told a Post-Gazette reporter. "When I got to my feet, everything was black. Everybody ... was running and screaming and then I fainted."
>
> "I had just entered my barber shop when the explosion came," Joseph Sharp said. "The ceiling bulged a bit and dropped just as I reached the front door. Two adjoining buildings swayed a bit and then seemed to fold up. Then everything got black."[54]

Equitable Gas never again utilized that particular type of storage, but gas leaks remained a perennial problem even after the tragedy. The repair work that caused the explosion suggests that the tanks were starting to deteriorate with age; some of the city's gas infrastructure was more than forty years old. The existence of large gas storage structures in a densely built and highly populated area ended in a worst-case scenario, yet did not seem to discourage gas use afterward. The continued use of natural gas for domestic light, heat, and cooking indicates the continued importance of gas in the life of the city and the persistence of that layer of the carbon palimpsest, despite the city's renewed blanket of coal smoke. The history of gas use after the Manchester explosion demonstrates that natural gas remained an important energy source, despite its hazards and the alternative of cheap available coal. [55]

---

[54] W. S. Brotzman, "Damaging Gas Explosion at Pittsburgh, PA," *Monthly Weather Review* (Weather Bureau, January 25, 1928), 11, doi:10.1175/1520-0493(1927)55<500a:DGEAPP>2.0.CO;2; Barcousky, "Eyewitness 1927."

[55] Tarr, "Energy Capital," 19.

2.4 Infrastructure: Mid-century Pipelines

To meet Pennsylvania's demand for natural gas in the middle decades of the twentieth century, pipelines transported natural gas from the southwestern United States. As the Appalachian region ceased to be the primary hub of commercially distributed natural gas, and the federal government became increasingly involved in interstate gas regulation, the network of pipelines that crossed state lines expanded.[56] In addition, patriotism and the demands of World War II influenced planners of energy infrastructure. During this time, the gas industry gained a significant power: the ability to exercise eminent domain to obtain pipeline rights-of-way. This muddled the distinction between public and private land ownership.

The first big interstate pipelines to transport natural gas from the southwest oil and gas fields to Pennsylvania, called the Little Inch and the Big Inch, were originally constructed to transport petroleum for defense purposes during World War II. Oil supplied through pipelines was less susceptible to enemy disruption. Even before the war began, President Roosevelt and his advisors recognized the importance of petroleum to the modern war effort, and the vulnerability of ocean-going tankers that transported nearly all oil at the time. Secretary of the Interior Harold Ickes advocated for pipeline construction even if it was uneconomical. He declared, ". . . in the event of an emergency it [a pipeline] might be absolutely necessary." Even the oil tanker industry soon concurred.[57]

---

[56] Waples, 88.

[57] Christopher J. Castaneda and Joseph A. Pratt, *From Texas to the East: A Strategic History of Texas Eastern Corporation* (College Station: Texas A&M University Press, 1993), 17.

Despite some remaining resistance, the emergency-driven pipeline plan succeeded. Railroads were the most serious opponents of pipeline construction because they had a vested interest in the transportation of coal, a competing fuel. Railroad opposition prompted federal legislation that granted interstate pipeline companies the right of eminent domain to obtain easements along their proposed routes. Railroad interests had initially succeeded in blocking eminent domain cases at the state level. In response, in 1941 Maryland Congressman William Cole successfully introduced a federal bill that became the Cole Act, which granted pipeline companies condemnatory power in the interests of national security.[58] The subsequent attack on Pearl Harbor, and extensive shipping losses to submarine warfare—at one point enemy subs were sinking three tankers a day—prompted heroic efforts by the War Board and everyone else involved in pipeline planning, supply and construction. Despite incredibly adverse conditions, the nearly three-thousand-mile project was completed in December 1943.[59] Another major pipeline, this one from Texas to West Virginia specifically for natural gas, was also constructed during World War II. Again, the War Board quickly approved the allocation of material for this line. Northeastern manufacturing deemed critical to the war effort required the gas. After the war, this pipeline functioned as a precedent and foothold for southwestern gas suppliers seeking markets in the industrial east.[60]

---

[58] Castaneda and Pratt, 19.

[59] Ibid., 25; Castaneda and Pratt relate details of the difficulties involved. Crews excavated major trenches and laid pipe at breakneck speed through river crossings in the Ozarks, and across the Appalachians in winter, in an era before any extensive interstate highway system existed to facilitate the movement of men and material. Whatever one thinks of their associated costs and disruptions, the Inch lines were an impressive achievement.

[60] Castaneda and Pratt, 28.

As World War II ended, and the peacetime economic conversion began, the federal government classed the Inch pipelines with other surplus war materiel. In 1947, Texas Eastern Corporation acquired the lines, and repurposed them for natural gas transmission. Railroad and coal interests again opposed the gas conversion plan, this time joined by local gas suppliers, none of whom wanted to lose energy market share.[61] Nevertheless, Texas Eastern succeeded in establishing natural gas lines from Texas that stretched across Pennsylvania's entire southern tier and ended on the east coast.[62] These lines were part of the expanding network of gas transmission built after the war—a kind of "golden age" for interstate gas companies.[63]

During the late 1970s and early 1980s resurgence of the Appalachian gas industry, pipelines systems also multiplied. In Pennsylvania, the expansion of the gas pipeline network apparently caused no widespread public objections. Individual reports on the general acceptability of gas pipelines are supported by the coverage, and lack thereof, in the trade and popular press.

One individual report comes from Sam Delassio, a landman in the 1980s, during Pennsylvania's last big expansion of shallow-well gas drilling. A landman is an independent contractor who negotiates with landowners on behalf of an energy company for mineral leases and rights-of-way. Delassio was a well-known cattle dealer when the gas company recruited him. At least one of Sam's neighbors, who was in high school then, remembered thinking how smart that was. Delassio had a good honest reputation and an established working relationship with area farmers. His trustworthiness was an asset when he contacted landowners about gas rights.[64]

---

[61] Ibid., 68.

[62] American Oil and Gas Historical Society, "Petroleum in War: Big Inch Pipelines of WWII," accessed April 19, 2017, https://aoghs.org/petroleum-in-war/oil-pipelines/.

[63] Castaneda and Pratt, 79.

[64] Personal conversation with John Mattilio, April 25, 2016.

Delassio himself claimed to have received no particular training for the job, and pointed out that anyone could go to the courthouse and see which properties were leased or not. He was in fact so familiar with the situation of folks in his area that he already knew whom to approach. Delassio related that all the people he contacted were in favor of leasing their mineral rights; they were happy to be asked. They would get a royalty for gas produced from shallow wells, usually one-eighth the total value, or sometimes more in especially promising areas. They would get free gas, so they would have no heating bill. The situation was the same for pipeline easements—no one objected. The money was the important thing, even though Delassio was and is careful to explain that once the company has a right of way, the land does not really belong to the farmer anymore. No structure can be built on it, and any roads that cross it can be torn up.[65]

Articles in Pennsylvania's main agricultural trade press corroborate Delassio's narrative. In the 1980s, Lancaster Farming presented pipelines as a familiar and benign technology, only opposed by those whose economic self-interest conflicted with a larger public good. In June 1983, the paper ran a story on pipelines, which focused on how simple, effective, and economical a pipeline is for transporting many commodities. The article stressed the long history that pipelines had. Prompted by a proposed international pipeline then much in the news, the article stated: "If and when the pipeline to carry natural gas from Siberia to western Europe is built, it will be just one more piece in the world's vast, largely invisible network of underground pipes carrying commodities (even milk!) from one place to another."[66]

---

[65] Sam Delassio, Personal communication, January 10, 2018.

[66] "Oil, Garbage and Milk – They're All in the Pipeline," *Lancaster Farming*, June 25, 1983, B10, accessed January 6, 2018, http://digitalnewspapers.libraries.psu.edu/Olive/APA/lancasterfarming/?skin=lancasterfarming#panel=document.

The article implied a parallel between current and historic opposition to pipeline construction. It described the beginning of Pennsylvania pipelines in the nineteenth century, beginning with the lines laid for petroleum during the 1860s oil boom. At first, early efforts to pipe oil failed, because teamsters who transported oil in barrels "ripped the lines out of the ground." Nevertheless, a subsequent attempt to pipe oil succeeded, reduced the cost of transport by more than two-thirds, and "an industry was born." The only basis for current opposition to pipelines, the article claimed, was against plans to pipe coal in slurry form—the railroads were fighting to keep the coal-hauling business. It stressed that pipelines had minimal impact on their surroundings; lines were "mostly unseen, their rights of way replanted after the pipe is laid." The only negative environmental impact mentioned was concern about the quantity of water needed to liquefy coal. Natural gas was not implicated.[67]

The editors used patriotic and other positive associations to further present pipelines in a positive light. They referred to the pipeline transport of milk, something all farmers were familiar with. They included a photograph of workmen cleaning a natural gas line, "so that the end product is as pure as possible." They placed the story on the "Kid's Korner" page, although the writing style and vocabulary level were similar to those in the rest of the paper. Just below the text was a color-by-numbers drawing of Daniel Webster, lauded in the caption as a fine orator and statesman, famous for declaring "Liberty and union, now and forever, one and inseparable." They pointed out the role of pipelines in winning World War II: the "famous" Little and Big Inch lines, and a "secret" line under the English Channel that supplied fuel to allies in Europe.[68]

---

[67] "Oil, Garbage and Milk."

[68] Ibid.

Lancaster Farming covered other positive connections between farmers and gas pipelines. It ran a number of articles about the heavy equipment manufacturing giant J.I. Case. One of these concerned a desirable farm machinery repair insurance service. Others introduced new and superior types of machinery. All mentioned that Case's parent company Tenneco also produced natural gas pipelines. The paragraph concerning Case, Tenneco and pipelines was essentially cut and pasted into a series of articles.[69] Another article discussed the connection between pipelines and the royalty income to farmers from gas leases. It explained that without a convenient pipeline, the gas well would be capped; the gas could not be extracted and sold. The landowner's payment would be limited to a small "shut-in royalty" to preserve the lease. However, these "delay rental fees" did not compare to production royalties, "the stuff dreams are made of," according to a community development agent.[70]

Newspaper coverage of the topic also supports the idea of general industry acceptance in less direct ways. It may be possible that Lancaster Farming had an interest in promoting pipeline construction, perhaps because of the paper's relationship with a company that bought a substantial amount of advertising space.[71] In that case, its handling of the topic might be intended to guide, rather than reflect, public opinion. The boiler plate about Tenneco's pipeline manufacture has a 'product placement' look about it. At the same time, the paper also published numerous real estate ads, composed and paid for by individual Pennsylvania landowners and their representative realtors, which mention gas industry leases as an asset; these ads support the probability that there

---

[69] "Case Offers Extended Repair Coverage," *Lancaster Farming*, June 29, 1985; "Literature Available on Case IH Windrowers," *Lancaster Farming*, September 12, 1987; "Case Introduces New Field Cultivators," *Lancaster Farming*, September 26, 1987.

[70] "Leases Can Mean Extra Money," *Lancaster Farming*, September 26, 1981.

[71] No such direct evidence surfaced in the course of research for this dissertation.

was general public acceptance of gas industry activity. [72] By contrast, no Lancaster Farming story during the 1980s reported a conflict between a landowner and a pipeline company over eminent domain and related issues. No story covered advice to landowners on how to negotiate with pipeline landmen, as the Pennsylvania Cooperative Extensive Service does now. A similar search of the Pittsburgh Post-Gazette archives also failed to yield any such coverage.

2.5 The Tyhurst Subdivision, South Park, Pittsburgh 1990

The final case study of this chapter examines an additional layer in southwestern Pennsylvania's palimpsest. Among the major changes in national land-use patterns during the same post-war era as the huge build-up of gas infrastructure described above, none had more impact than the enormous growth in suburban development. In the metropolitan Pittsburgh area, new subdivisions superimposed another layer on a landscape already heavily affected by a century of energy extraction. A new phase of residential building produced suburban sprawl on land that had supported first farms, then mines, then gas wells. One such development was the suburban Tyhurst subdivision in South Park Township, near Pittsburgh. The homes there, built in the late 1970s, were spacious and modern. Many featured the new split-level plan, with integral garages and large yards arranged along curvilinear streets. South Park was a high-end suburb, a category

[72] *Lancaster Farming,* The Pennsylvania State University digitized collection, accessed January 8, 2016, http://digitalnewspapers.libraries.psu.edu.

that continued to experience growth even during the inflationary 1970s, while Pittsburgh's general population continued to shrink with the decline of heavy industry.[73]

Late one night in December 1990, the blast from a natural gas explosion leveled one of these homes, severely injured its occupants, and caused the evacuation of the whole development. Like the 1927 Manchester tragedy, the explosion shows the potential for tragic consequences from the interlayering of extractive and residential land uses. The 1990 explosion further illustrates the entangled history of coal and natural gas extraction, the combined problems of leaking gas and aging infrastructure within a residential area, and the low public awareness of any danger this might cause. The Pittsburgh Press, the Pittsburgh Post-Gazette, and other local newspapers reported that just before midnight on December 28, 1990, an explosion and fire leveled a home at 1268 Armstrong Drive in the Tyhurst subdivision of South Park. Owners Frank and Sandy Votodian and their two sons—fourteen-year-old Francis Jr., and nine-year-old Joey—were in bed at the time of the blast. The doctors who admitted the family to Mercy Hospital's burn unit listed the parents and younger son in critical condition. The older boy, less badly injured, was in fair condition. [74]

By the next morning, the situation forced twenty-seven families in the neighborhood to evacuate, while the fire marshal, community leaders, and representatives from Equitable Gas Company attempted to determine the source of the gas that caused the accident. To begin, officials investigated evidence of a problem that occurred before the explosion. Two weeks previously,

---

[73] Kent MacIntyre James, "Public Policy and The Postwar Suburbanization of Pittsburgh, 1945-1990," PhD diss., (Carnegie Mellon University, 2005), 140, 142.

[74] Mary Niederberger, "75 South Park Families Evacuated Due to Blast," *The Pittsburgh Press*, December 29, 1990; Steve Twedt, "3 In Family 'Critical' After Blast Levels Home," *The Pittsburgh Press*, December 29, 1990.

some neighbors had reported the smell of gas. At that time Equitable Gas servicemen had not found any leaks in the lines that supplied nearby homes. The Pennsylvania Department of Natural Resources (DER), responding to those earlier complaints, had investigated an active gas well about 200 feet from the Votodian house. The inspectors reported that the problem was a leaking valve, which was then presumably repaired. Nevertheless, as servicemen found no leaks in Equitable's supply lines after the explosion, suspicion centered on the well. Equitable informed investigators that it purchased gas from the well, but did not own it. At first, officials could not reach the owner of the well.[75]

Allegheny County Fire Marshal John Klaus concluded that the active gas well was the source of the leak that fueled the explosion. Klaus agreed with Equitable that the leak did not seem to originate in its lines. Gas had leached from the well into the surrounding wet soil, and followed the path of least resistance along underground pipes and utility lines. Gas had accumulated in the Votodians' basement, and the pilot light of their hot water heater probably ignited it. Investigators detected high levels of gas inside another house near the Votodians,' prompting the evacuation of the remaining residents of the Tyhurst subdivision, seventy–five households in all.[76]

By New Year's Day 1991, four days after the explosion, investigators had officially attributed the gas leak to the active well, which was owned by a person that news reports identified as Joseph Augustino (his correct name was Agostini). He was not arrested or charged with any wrongdoing. The local police chief remarked to newspaper reporters that lawsuits would sort out the issue of liability. Pennsylvania DER ordered Agostini to engage a contractor within twenty-

---

[75] Niederberger, "75 South Park Families"; Bill Steigerwald, "27 Families Near Gas Blast Site Evacuated," *Pittsburgh Post-Gazette*, December 30, 1990.

[76] Niederberger, "75 South Park Families"; Bill Steigerwald, "60 Families Near Gas Blast Site Evacuated," *Pittsburgh Post-Gazette*, December 31, 1990.

four hours to permanently cap the well with a concrete plug. At that point, it looked as though the evacuated families could return home because all nearby houses had tested free of gas, and workers had flared off some accumulated gas at the well. However, the residents who did return kept their bags packed and nervously watched to see whether their neighbors would decide to remain home or to stay away. Even though investigators had identified the problem, uncertainty remained about the possibility that gas would continue to leak until the well was properly plugged.[77]

Work to plug the well did not go smoothly. Township police informed twenty-eight families that it could take days or weeks before their homes would be declared safe. Tight security kept everyone except the work crews out of the area. The contractor planned to pull the old well casing, insert a new pipe to prevent more gas from seeping out, and pour a concrete plug. As the crews worked, they discovered fresh leaks. The original casing had been installed in the 1920s, and according to a DER spokeswoman, "looked like Swiss cheese." The work was further hampered by debris in the well. An interesting find among the debris was a wrench typical of the 1920s, further evidence of the well's age. Digging reached twenty-seven feet below ground, but then stalled. DER officials ordered Agostini to hire additional crews and acquire the equipment necessary to complete the project.[78]

The evacuated residents were frustrated and afraid. They did not know when they could safely return, and some felt they never wanted to go back to what had been their dream homes. Their homeowners' insurance policies typically covered only fourteen days of temporary housing

---

[77] J. Kenneth Evans, "Gas Leak is Traced, Families Can Return," *Pittsburgh Post-Gazette*, January 1, 1991.

[78] "Workers Start Sealing Well Tied to Home Blast," *Pittsburgh Post-Gazette*, January 5, 1991; Jeffrey Fraser, "New Leaks Point to Well as Cause of Gas Explosion," *The Pittsburgh Press*, January 7, 1991; Ralph Haurwitz, "Well is Far from Being Plugged," *The Pittsburgh Press*, January 26, 1991; Mackenzie Carpenter, "Delay in Returning Home Frustrates Evacuees," *Pittsburgh Post-Gazette*, January 8, 1991.

in the event of a civil order for evacuation. Many Tyhurst residents would remain displaced under evacuation orders until the beginning of February. The township authorities had responded to the emergency in several ways—they helped start a fund for donations toward the Votodians' medical expenses, they sponsored informational meetings, and they provided a group session for psychological counseling. However, they announced that the township could not be responsible for paying extended hotel bills or other expenses. As the police chief suggested earlier, these authorities advised the homeowners to seek compensation through legal proceedings, presumably from the owner of the well or other involved parties. Nevertheless, some homeowners felt that the civil authorities had "screwed up" in some way that contributed to the disaster, and now were leaving private citizens to cope on their own.[79]

Frank Votodian was also anxious to reconstruct his life. In a January press conference at Mercy Hospital, he stated that he would go back to South Park and buy or rebuild, although not on the location of his old house. Insurance would cover the cost of building and refurnishing. He declined to comment on the possibility of a lawsuit. Votodian was angry, but also thankful. All of his family were alive, and both Votodian and the director of Mercy Hospital's burn unit marveled that any of them had walked out of that house. Flames had engulfed it within minutes and left only a part of one wall standing. The Votodians were also grateful that doctors expected them to fully recover with the help of skin grafts, therapy, and other treatments to minimize damage and scarring.[80]

---

[79] Fraser, "New Leaks"; Carpenter, "Delay in Returning"; Jan Ackerman, "Residents Sue for Damages in South Park Gas Well Blast," *Pittsburgh Post-Gazette*, Mar. 12, 1991.

[80] Ralph Haurwitz, "Victims of Gas Explosion Angry, Thankful," *The Pittsburgh Press*, January 16, 1991.

As the weeks went by, the official reaction from the township appeared to grow defensive. Amid the ongoing public criticism, the South Park Township emergency management director claimed that the township had informed sixteen organizations and individuals immediately after the explosion. In addition to DER, these included county and state elected representatives, the Public Utility Commission, and the Red Cross. The township supervisors soon employed a solicitor to investigate how much power they actually had to control drilling, and to determine if they should impose tighter regulations. Pennsylvania DER received legal authorization from the district common pleas court to take over the project of plugging the well and monitoring gas levels near the site because work under Agostini had not made satisfactory progress.[81]

The evidence from the newspaper coverage suggests that Joseph Agostini was an ineffective and elusive figure. News reports variously misspelled his name as Augustino or Agostoni. His address was also uncertain. Different reports claimed that he was from Monongahela or perhaps Finleyville, both Monongahela Valley towns south of Pittsburgh. Agostini had owned the sixty-eight-year-old well for just six or seven years before housing construction began in the Tyhurst subdivision. He apparently lacked the expertise or the financial resources to cope with the problem well. When he acquired the well, state law required him to either post a twenty-five thousand dollar bond, or pay a fifty dollar permit fee if he could not afford the bond. The money contributed to a state fund to deal with problems that arose with wells. Some of that fund would pay for DER actions in South Park. Agostini had paid the fifty dollar fee.[82]

---

[81] Jackie Nicoll, "Regulating of Gas Wells Proposed," *Pittsburgh Post-Gazette*, January 17, 1991.

[82] "Active Oil and Gas Wells a Fact of Life in Pennsylvania," *Beaver County Times*, January 14, 1991.

The gas well leak and explosion were part of an interconnected series of problems for the officials and certainly the residents of the Tyhurst subdivision in South Park, stemming from land-use decisions made long before construction of their homes in the late 1970s. First, it was hard to avoid gas wells. "Wells are a fact of life in this part of the world," a DER geologist informed a reporter in 1991. At that time, DER estimated that 25,000 active natural gas and oil wells were located in metropolitan Pittsburgh. In addition, as many as 500,000 abandoned wells existed in southwestern Pennsylvania, some dating back to the second half of the nineteenth century. They were, and are, very common in residential sections of Allegheny and Westmoreland counties. Nevertheless, the president of the Pennsylvania Oil and Gas Association insisted that well explosions like the one in South Park were possible but very unlikely. He declared, "'It's also possible that the earth could be hit by the moon.'" In addition to the presence of gas wells, the development contained another layer of southwestern Pennsylvania's carbon palimpsest—a coal mine. A DER official claimed that acid draining from an old coal mine or seam may have caused the advanced state of corrosion in the sixty-eight-year old gas well pipe. However, according to the state director of oil and gas management who also commented on the gas explosion, the cause of the corrosion was beside the point. In his opinion, real estate developers, not miners or drillers, were at fault if any problems arose from the proximity of wells, mines, and houses. In other words, the wells and mines were there first.[83]

Local zoning authorities had in fact objected to South Park's Tyhurst subdivision, which developed multiple problems resulting from earlier land uses. The township supervisors initially voted not to allow the development, because they had (correctly, as it turned out) anticipated

[83] Ibid.

complaints from future residents about the strong smell from a near-by sewage treatment plant. However, the developer successfully contested that decision in court and went ahead with the plan. Then, flooding became a problem shortly after the houses were built. In 1981, work began behind Armstrong Drive to reclaim abandoned strip-mined coal land and construct a sports field on it. The reclamation and construction work disturbed the local water table and drainage patterns, which caused the flooding. Yet another controversy arose concerning the neighborhood landfill, and that problem was also related to local mining and drilling. During the summer before the well explosion, M. C. Arnoni Co., owner of the landfill, had applied for permission to expand it by blasting with dynamite. Neighbors had already objected, but unsurprisingly, after the December 1990 explosion they voiced increased fears. Even if the cap on the problem well worked, a dynamite blast might trigger new leaks. DER officials were undoubtedly concerned that blasting would touch off more explosions of accumulated gas in underground pockets. They instructed Arnoni to shelve his expansion project. They also drilled holes into the old coal mines located under the landfill, in order to monitor methane gas levels there.[84]

Finally, in mid-February, DER determined that the leaking well was safely plugged by six hundred feet of cement. In March, a group of Tyhurst residents filed a class action suit for damages from the events connected with the explosion. They accused Agostoni and Equitable Gas of conducting an "'ultra-hazardous activity'" and "creating a 'private nuisance,'" by operating a gas well in a residential area. The suit named Darcy Production and Operations, the company initially called in to repair the leaking valve before the explosion, and to attempt plugging the well afterward. The suit also named the following individuals and businesses for failing to inform

---

[84] R. Lamont Jones, Jr., "Blast Is Latest Woe to Befall Housing Plan," *The Pittsburgh Press*, January 17, 1991; Nicoll, "Regulating of Gas Wells."

home-buyers of the well's existence: Donald Bierworth, owner and developer of the Tyhurst Plan; Russell Industries, owner of the well-site land; and Ryan Homes, the construction company that erected the houses. A few weeks later, a second group of residents filed a similar suit, which the courts allowed to join the first in a consolidated action. The Votodian family hired an attorney, but did not join the class action suit. At that point, public reporting of the affair appears to end.[85]

The narrative of the explosion that leveled the Votodians' home and threatened an entire neighborhood prompts a question. How is it that although gas wells and other gas infrastructure were so ubiquitous in Allegheny County, and had been for over a century, they were for the most part invisible to both private citizens and public officials? When the Tyhurst residents smelled gas, they did not call the police or try to find the owner of the well located only a few hundred feet from their homes. Instead, they assumed that the problem was in the utility delivery system and called Equitable, their local supplier. The residents were angry that neither the builder nor the real estate developer had informed them that such a well existed within the subdivision, but it evidently had never occurred to anyone to ask. Even before that, when the township supervisors tried to prevent the subdivision's initial development, they did not raise the issue of the well's existence to add weight to their objections. Only after the Votodians' house blew up did anyone take the trouble to locate a number of abandoned gas wells in the neighborhood. Only after the explosion did DER nix the landfill owner's plans to excavate using dynamite, although presumably the agency would have had better access to information about the existence of possible hazards than other actors. It is difficult to know what answers to this question the affected parties might have supplied, without interviews with those involved. The lack of further news coverage and the

[85]Jan Ackerman, "Evacuees Sue Over Gas Well Explosion," *Pittsburgh Post-Gazette*, Mar. 12, 1991; "35 More Sue Over South Park Gas Explosion," *Pittsburgh Post-Gazette*, Apr. 4, 1991.

absence of any record of court proceedings suggest that the civil suit was settled out of court, possibly with a non-disclosure clause in whatever agreement the parties reached.[86]

Suburban development in South Park had overwritten the record of earlier landscape use. The older script was there, but more obscure. The evidence of past coal mining was hidden under reclamation work, a ball field, and a landfill. The gas well was also from another era, and so unobtrusive that people who moved to the area had either not noticed it or had disregarded it while choosing a home. Even DER officials and people in the gas industry, possessed of more knowledge about past energy extraction, viewed the old workings as an ordinary part of the landscape. After all, for every well that figured in a dramatic newspaper article, perhaps thousands of others operated throughout their productive existences without causing any easily perceptible problems. Despite the December 1990 explosion, there was no drastic exodus by the residents of South Park. Today, Armstrong Avenue remains a pleasant, well-kept street. The house now standing at 1268 Armstrong looks like a nice place to live.

2.6 Conclusion

At this writing, in spring 2019, pipeline construction appears more newsworthy than well drilling. Protests by the Standing Rock Sioux and other environmental groups drew national and international attention to the Dakota Access and the Keystone XL oil pipelines, meant to carry crude from the Bakken oil fields and the Alberta tar sands to refineries on the Texas Gulf. The controversy gained fresh attention when a January 2017 memorandum by President Donald J.

[86] This was common practice, according to historian Joel A. Tarr, personal communication Mar. 5, 2013.

Trump revived these projects, which had halted under the previous Obama administration. Students attending a recent lecture of mine on energy issues were familiar with the pipeline controversy. However, they were very hazy on gas drilling—what fracking meant, for example, or what the Marcellus shale was.

In Pennsylvania, pipelines have also become controversial. After the dramatic drop in energy prices circa 2014 caused by a natural gas glut, the gas industry focused on the infrastructure necessary to expand its markets. Unlike in the past, the industry faced substantial and well-publicized protest from residents of Pennsylvania's towns and farms along proposed pipeline routes.[87] In response to the tremendous surge in planned pipelines, nearly 3,000 miles of line in Pennsylvania's Marcellus basin, the state extension service prepared a fact sheet for affected landowners. It anticipated questions about the process of pipeline construction, how they are regulated and inspected, and important points to negotiate. Despite its advice on how to negotiate, there is no advice on how to prevent a pipeline from being built on one's land. The fact sheet emphasized that in the state of Pennsylvania, pipeline companies have the right of condemnation, or eminent domain, to secure easements for an interstate pipeline. Companies deemed public utilities, which includes all companies that deliver any sort of energy to consumers, may condemn land for a pipeline easement whether the line is interstate or not.[88]

My own family was recently faced with the possibility of living over a major new gas pipeline. Despite the new negative public attitude (at least among some groups of Pennsylvania

---

[87] Susan Phillips, "Pipelines: The New Battleground Over Fracking" *State Impact*, April 2, 2015, accessed March 7, 2018, https://stateimpact.npr.org/pennsylvania/2015/04/02/pipelines-the-new-battleground-over-fracking/.

[88] Dave Messersmith, "Negotiating Pipeline Rights-of-Way in Pennsylvania," Penn State Extension, accessed March 3, 2018, https://extension.psu.edu/negotiating-pipeline-rights-of-way-in-pennsylvania.

citizens) toward expansion of the fossil fuel network, our situation was governed by the events from past decades, especially events that had determined the location of existing gas infrastructure, and the ability of pipeline companies to condemn land. In the summer of 2015 a man came to our Bedford County farm on behalf of Spectra Energy (the company which has acquired Texas Eastern of Big Inch and Little Inch fame). Spectra was planning a new pipeline route. Part of it would run through Cumberland Valley Township, a narrow valley between Wills Mountain and Evitts Mountain in southern Bedford County, and right through the center of our farm. The line would connect with the Texas Eastern pumping station on the old Inch line, just to our north, and extend south to the Carolinas. Spectra wanted permission to survey the route on our land.

I did not want to let Spectra's landman into the house, although in hindsight that decision would deny me a kind of research opportunity. Several neighbors and my husband Jim met with the landman at another affected farm. Afterward, Jim thought I should hear what the man had to say, and we invited him back. He brought maps generated from court house deed records; the maps were bad. He said that the company wanted a hundred foot right of way. The proposed route went between our house and Evitts Creek, which are perhaps sixty feet apart. At that point I gave in, and signed the survey permission. It seemed to me that if Spectra was going to run a pipeline through my kitchen, we should both know about it ahead of time.[89]

No surveyors arrived, and we heard unofficially that the project has been shelved. If the company had proceeded, we would probably not have been able to refuse permission, or even negotiate from a position of strength. Because events seventy-five years ago—especially the

[89] I see now that I was not thinking clearly about those inaccurate maps. Of course the deed maps were necessary to identify the owners of land along the projected route, that's why the landman had them. However, as far as accuracy for planning purposes, no survey would have been necessary. Spectra has Google Maps like everyone else, and most certainly employs experts in ArcGIS software.

wartime emergency, and opposition from railroads—gave Texas Eastern the authority to build the Inch lines how and where they did, our valley became a logical location for another pipeline. Only the amount of compensation would be in question. How much would the pipeline devalue our farm? Like many farmers, our main asset is land. If circumstances require us to sell out, potential buyers reading the real estate disclosure form would certainly sit up and take notice of a major gas pipeline. Their lender would, too. Times have changed. Back in the 1980s when we bought our land, we were as indifferent as possible to the implications of the natural gas pipeline pumping station only seven miles away. We were not much different from the officials, builders, and homeowners in South Park.

For over two centuries, the physical structures of fossil fuel extraction have accumulated in the Pennsylvania landscape. The infrastructure of natural gas, which developed in tandem with the extraction of coal and petroleum, created what engineers call "path dependence." This phrase is shorthand for the way technologies tend to develop as a result of their existing structures. In other words, decisions in the past—the history of a technology written in the landscape—created a path of least resistance for current and future development. Less tangibly, but just as importantly, the beliefs and values of Individuals and institutions operate in a similar way. [90] In the southwestern Pennsylvania gas fields and the urban spaces they supplied, past events helped create a climate of acceptance for gas extraction and use, despite the repeated evidence of disastrous consequences. A strong inertial force, born of long coexistence, accustomed residents of the Pittsburgh metropole to the workings of the gas industry. The rights and choices of surface owners were a lesser issue, as the following chapters show.

---

[90] Ian Greener, "Path Dependence," *Encyclopedia Britannica*, accessed 11/1/2018, https://www.britannica.com/topic/path-dependence.

3.0 Erie, Pennsylvania: Drilling the Lake

Lake Erie is beautiful. It gives land-locked Pennsylvania its only "seashore." Presque Isle, a peninsula arching out from the Erie coast, is Pennsylvania's largest and most visited state park. It is ecologically diverse, sheltering more of Pennsylvania's rare and endangered bird species than any place of similar size in the state. It features rich and varied habitat—shoreline, dunes, marshes, ponds, shrubby thicket, and climax forest. The most fragile habitat contains many threatened plant species.[91]

Erie, town and county on the lake, had significant strategic and economic importance from the mid-eighteenth century up through the mid-twentieth century. Its natural resources and location, later augmented by canals and railroads, made it a military, commercial and industrial asset important far outside the immediate region. Traditionally, Erie based its civic pride on its contribution to national economic expansion. Numerous regional histories published in the nineteenth and early twentieth centuries reflect that pride and prosperity.[92] But the source of Erie's prosperity was also the source of residential, manufacturing, and agricultural waste. By the mid-twentieth century, Lake Erie was severely polluted, its fishing industry declining, and its beaches unsafe.

During the 1960s at the beginning of the modern environmental movement, serious efforts to address and improve the lake's degraded condition coincided with a local fight against state

---

[91] Commonwealth of Pennsylvania, Department of Conservation and Natural Resources, Presque Isle Website, accessed November 9, 2018, https://www.dcnr.pa.gov/StateParks/FindAPark/PresqueIsleStatePark/Pages/WildlifeWatching.aspx.

[92] Mary Muller, *"A Town at Presque Isle": A Short History of Erie, Pennsylvania to 1980* (Erie County Historical Society, 1991), bibliography.

plans to drill for natural gas in the lake bed off Presque Isle. Although Erie people who opposed drilling had little direct power to affect Pennsylvania's plans, outside events raised the national environmental consciousness enough to influence the state's policy and stop lake-bed drilling. However, the energy shortages of the 1970s and natural gas price deregulation at the federal level renewed state interest in drilling the lake. At the same time, Erie was part of the deindustrialization and impoverishment of the northeastern United States 'Rust Belt.' Issues of economic necessity and civic pride complicated the local attitude toward gas extraction. Most Erie residents and leaders remained opposed to lake-bed drilling, and in the end multi-state and cross-border initiatives prevented off-shore gas extraction. However, the city allowed extensive unregulated onshore wells, until the Pennsylvania Oil and Gas Act of 1984 set a number of limits. To date, there are no gas or oil wells in Lake Erie along the Pennsylvania shore, although drilling is permitted under state law. A federal ban has prevented off-shore drilling, at least for the present.[93]

This chapter, the first part of a study of natural gas extraction in Erie, Pennsylvania, involves the controversy over plans to drill for gas in the bed of Lake Erie from 1968 to 1982. It follows actors at the local, state, and federal level—Secretary of the Pennsylvania Department of Fish and Waters, Dr. Maurice Goddard, who initiated the plan; the citizens and leadership of Erie, who opposed the plan; and the United States Army Corps of Engineers, the agency in charge of the permitting process at the federal level. All three had their aims and strategies affected by nearly simultaneous mandates to protect the environment and extract more energy. What happened in Erie illustrates the importance of scale in resource regulation. At the national or state scale, a cost-benefit analysis of environmental protection versus energy extraction may be quite different from

[93] Pervaze A. Sheikh, et al., "Drilling in the Great Lakes: Background and Issues," Library of Congress. Congressional Research Service (Washington D.C., November 11, 2008), 4.

how the impacts and advantages look on the local level, as they did in Erie. The fight over drilling Erie's lakebed illustrates the convergences and contingencies that shaped twentieth-century drilling policy Pennsylvania.

3.1 Geography, Geology, and Pride

Erie's geography and geology have largely shaped its civic identity and pride as it evolved over the last three centuries--as a transportation hub, a resource extraction and industrial center, and a recreational mecca. The city owes its existence to the peninsula that forms a natural harbor on Lake Erie's shore. Presque Isle peninsula is an arc-shaped sand spit of glacial moraine sediments, left behind by the melting glaciers that also filled the lake with water. The peninsula is connected to the mainland by a very slender neck where water occasionally breaks through, transforming the wider section into an actual island several times during the last hundred years. Wind and wave action cause the whole peninsula to gradually shift eastward, at the rate of about a half mile per century. The constantly changing shoreline contributes to the diversity and fragility of Presque Isle's ecosystem.[94]

The drainage patterns extending south of the Lake Erie shoreline, also shaped primarily by the glaciers of the last ice age, made Erie an important link in extensive transportation systems in the northeastern United States. The glaciers deposited layers of sand, gravel and fine glacial till over fairly level strata of Upper Devonian and Lower Mississippian shales and sandstones. The flat lake plain ends at an escarpment that rises to the rolling upland Appalachian Plateau. An upland

[94] Presque Isle, Erie PA. "Park History," accessed July 17 2017, http://www.presqueisle.org/about/park-history/.

drainage divide runs roughly parallel to the escarpment. The divide is not high, but it serves to make Erie County the border between two major drainage basins and navigation systems. It sends some streams and rivers north into Lake Erie and the Great Lakes drainage basin. Others flow south via French Creek into the Allegheny River, whose waters join the Monongahela River at Pittsburgh to form the Ohio, a tributary of the Mississippi.[95]

Erie's advantages as a transportation hub connecting two great river systems made it a natural location for the industry that supported its growth into an important city. Unfortunately, by the mid twentieth century, industrial pollution threatened the city's drinking water supply. Because the groundwater under the lake plain tends to be saline, except at very shallow depth, most public water came from Lake Erie and other surface water. A serious decrease in fish catches underscored the decline in lake water quality. In order to deal with the problem, some industries experimented with a different waste disposal method of injecting waste into deep wells instead of allowing it to run into the lake.[96] Waste injection wells would later create problems of their own.

Resource extraction was another part of Erie's economy. In the 1960s, natural gas was an increasingly important regional source of extractive wealth, but not the largest. At that time, sand and gravel were Erie's biggest commercial mineral asset, used for road-building, masonry, and cement. Half a million tons were sold annually. As a gas producer in the first half of the twentieth century, Erie was "small but steady" with about 325 wells drilled over that fifty-year period. Exploratory wells drilled in 1961 opened up new sources, and by 1965 commercial producers had sunk more than 100 new wells. However, Erie remained a net importer of natural gas from the

---

[95] John C. Tomikel and Vincent C. Shepps, *The Geology and Geography of Erie County, Pennsylvania* (Pennsylvania Bureau of Topographic and Geological Survey, 1967), https://archive.org/details/geographygeology00tomi.

[96] Tomikel, *Geology and Geography of Erie County.*

southwestern states. During the summer, gas was stockpiled underground in old exhausted gas workings.[97]

Erie has its own public narrative, which affect its citizens' perception of natural resource extraction. Erie's history and historiography celebrates its long significance in national and international affairs. Mid-twentieth-century Erie as a municipality mirrored the indignation of individual residents of the region, whose standing and opportunities had been reduced by broad systemic forces—sometimes in ways that are ironic. The civic identity of Erie was built on trade, resource extraction, and especially industrialization, all highly polluting. Yet by the 1960s the city had compelling reasons to preserve its natural environment.[98]

Erie's importance for trade and defense was recognized early, certainly by the time of the eighteenth-century French and British wars of empire. The Erie site was a key link in the water route from the Atlantic seaboard all the way to New Orleans. The excellent natural harbor in Presque Isle Bay was one of the best in the Great Lakes/Saint Lawrence River system, which links the American interior with the Atlantic Ocean. In addition, the harbor is only a fourteen-mile portage from French Creek, a tributary of the Allegheny River system, part of the Mississippi watershed.[99] The French, the British, the native inhabitants, and eventually several members of the newly-independent United States contested control of Presque Ilse bay. Finally, the state of Pennsylvania, which previously lacked a connection to the Great Lakes shoreline and

---

[97] Tomikel, *Geology and Geography of Erie*, 53-55.

[98] For an insightful discussion about problems of presenting a non-declensionist history of a place where identity is strongly connected to industrialization and energy extraction, see Chris J. Magoc, "In Search of a Useable, Hopeful Environmental Narrative in the Mid-Atlantic." Special Issue, *Pennsylvania History: A Journal of Mid-Atlantic Studies* (Summer 2015): 314-328.

[99] Tomikel, *Geology and Geography of Erie*, 9.

transportation corridor, purchased the "Erie triangle" from the federal government in 1792.[100] Erie's importance to the new nation rose further during the War of 1812, when it became the premier United States naval shipyard and the site of a decisive American victory, a heroic past much celebrated in Erie's public history.[101]

In the nineteenth century and continuing up through World War II, Erie grew and industrialized in step with the innovations of the times, and retained its national importance. The General Electric Company's Erie division, a major manufacturer of locomotives, helped make Erie "the Boiler and Engine Capital of the World," and was a major defense contractor during the war.[102] The local Hammermill Paper Company was a significant supplier to the bureaucratic side of the war effort. But Hammermill is emblematic of the Erie industries that generated wealth at a severe environmental cost to the lake. In the 1920s, with the growth of automobile travel, Erie leaders first began to consider the economic benefits of tourism. The conflict between environmental and industrial claims on Lake Erie began to be evident.[103] After the industrial boom times of World War II ended, Erie was part of the general decline in the de-industrializing 'rust belt.' Tourism and the service sector gained more importance. Unfortunately, serious pollution in the lake discouraged fishermen and vacationers. [104] Erie was in a downward spiral.

---

[100] Muller, "*Town at Presque Isle,"* 10-11.

[101] Erie Maritime Museum, 2017, accessed October 3, 2017, http://www.flagshipniagara.org/us-brig-niagara/flagship-niagara-about/.

[102]"Erie Historical Marker," Explore PA History, accessed February 20, 2019, http://explorepahistory.com/hmarker.php?markerId=1-A-C1.

[103] Muller, "*Town at Presque Isle",* 25-42.

[104] Ibid., 43-61.

Beginning in the mid-1950s, Mayor Louis Tullio, one of Erie's most influential leaders, made a sustained effort toward Erie's revival as a great city, modeled on Pittsburgh's famous Renaissance. Among his strategies were plans to revitalize the city waterfront to attract visitors.[105] Although Tullio and other Erie leaders still hoped to attract new industry, for example in plastics, to compensate for the loss of some heavy manufacturing, they were increasingly aware of the importance of tourism and the danger that pollution of Lake Erie posed to it. A 1968 federal study, in cooperation with civic leaders from all Lake Erie's bordering states, concluded that the principal pollutants were municipal and industrial wastes, and agricultural runoff, in that order. The low water quality was painfully evident with bad smells and vigorous algae blooms. It affected commercial and sport fishing. The number of visitors at Presque Isle State Park fell twenty-five percent in just one year, between 1971 and 1972. Major efforts to reduce pollution over the next five years had significant results. By 1977, record numbers again visited Presque Isle. Civic boosters stressed the importance of tourism as a growth industry, which added $178 million to Erie's economy in 1978. The environment was a factor in earning Erie the highest score in quality of life among a dozen Pennsylvania cities studied in 1975. Erie was rebranding itself.[106]

Nevertheless, the city's new image was fragile. Erie's citizens felt understandable dismay when one of their own neighbors ridiculed the town on national television. Erie's City School Director Mary Lamary was a guest on the popular Tonight Show, hosted by Johnny Carson. She referred to Erie as "'the mistake on the lake.'" Tullio was angry. He wondered why Lamary hadn't mentioned that Erie was voted an All-American City. He said, "I've worked hard to tell regional

---

[105] Ibid.

[106] Edward Wellejus, *Erie: Chronicle of a Great Lakes City* (Windsor Publications, 1980), 102.

and national audiences about the progress in Erie—new sewers to clean up Lake Erie, and the attractive tourist industry . . . one swipe like that wipes out all of the progress we have made to improve Erie's image."[107]

In 1968, amid the widespread local concern over lake pollution and the determined efforts to revitalize the city, Pennsylvania state officials announced a plan to drill for natural gas under Lake Erie. The mayor and county commissioners of Erie, local township supervisors, and Pennsylvania sportsmen's organizations strongly objected to lake-bed drilling, and they spent most of the year fighting it. The general consensus was that the lake had troubles enough already. Erie locals did not have the power to veto the plan outright, so they used grassroots campaigning, judicial actions, and legislative initiatives in their strategy to keep drillers out of Pennsylvania's section of the lake.

The state's drilling plan had a precedent on the Canadian side of the lake, where at least one exploratory well dated to 1913. Serious productive drilling began in the 1950s. In 1968, Canadians drilled forty-five new wells in the lake.[108] Despite the often-repeated declaration that the Canadian wells had caused no pollution problem, Erie's citizens had solid reasons for their objections. Conventional drilling, not just the current practice of hydro-fracking, produced a number of hazardous pollutants. As part of the routine process, drilling wastes include muds and cuttings. Muds are a slurry of water and dirt mixed with toxic drilling lubricant chemicals. Cuttings are the actual pieces of rock and soil excavated from the bore hole. Wells also generate "produced

---

[107] Jim Thompson, "Lamary Quip Angers Erieites," Erie Times-News, April 14, 1973, quoted in Cory Vaillancourt, *Lou Tullio: A Real Erie Guy* (Erie: Jefferson Educational Society, 2015). In fact, 'mistake on the lake' is usually understood as a reference to Cleveland, Ohio. That confusion may be no comfort to the citizens of Erie, who might be further angered if their city was reduced to being an obscurity in a group of dirty places on a dying lake.

[108] "Drilling Opposition Continues," *Morning News*, February 26, 1969.

water," or brine, which is very high in dissolved substances that are environmental threats—salt, organic compounds, heavy metals, and even radioactive material. The particular composition of produced water varies by site. These wastes are typically released into a body of water, deposited in landfills, or injected into deep wells. All these disposal methods carry the risk of spilling or leaching into ground and surface water. Many of the toxic materials, especially heavy metals, accumulate in the food chain where they can directly poison or cause long-term genetic damage. In a lake environment, these substances become more concentrated as they are absorbed by small aquatic organisms, which are consumed by larger ones. In turn, fish that interest humans eat these eaters. In addition to the pollution of routine drilling, accidental leaks and blowouts threaten land and water. Although not as visibly dramatic as an oil spill, natural gas (methane) releases are highly poisonous to aquatic organisms. The long history of fossil fuel extraction shows that accidental releases will occur. It's not if, but when. Even very recently, just before the fracking boom, a report on proposed drilling off Lake Erie's Ohio shoreline concluded that the state did not have sufficient power to properly inspect drilling operations, protect human and environmental health, and regulate disposal practices.[109]

3.2 Secretary Maurice K. Goddard's Plan

Maurice K. Goddard, Secretary of Pennsylvania's Department of Forests and Waters (DFW) from 1955 to 1970, and then Secretary of Pennsylvania's Department of Environmental

[109] Bryan M. Clark et al., *Dirty Drilling: The Threat of Oil and Gas Drilling in Lake Erie* (Cleveland Heights, Ohio: Ohio Public Interest Research Group Education Fund Policy Paper, 2002), www.ohiopirg.org.

Protection until 1979, initiated the plan to drill the Lake Erie bed. A strong advocate of drilling on public land, he was a political force to be reckoned with. That said, Goddard had an undeniable commitment to environmental protection. He was a highly-respected and committed conservationist in the manner of Gifford Pinchot, who is the symbol of utilitarian conservation, dedicated to the regulated, sustainable use of natural resources to ensure their availability and enjoyment for present and future generations. Pinchot is most often remembered for saying that resources should be managed "'for the greatest good, for the greatest number, for the longest run.'"[110]

Maurice Goddard's career followed Pinchot's principles, and his career path reflected the influence of Pinchot and other Pennsylvanian progressive-era conservationists like Joseph Rothrock and Mira Lloyd Dock. Goddard trained to work for the U.S. Forestry Service, and was an instructor and later director of the Mont Alto Forestry School. Mont Alto was founded 1903 by Rothrock and Dock to produce scientifically trained foresters on the German model, to address problems of deforestation, especially from clear-cut logging and strip-mining.[111] Goddard was similarly committed to the proper management of natural resources, and the protection of forests and clean water, but he was not a wilderness preservation advocate like, for example, John Muir.

---

[110] Quoted from Jeremy Bentham in Char Miller, *Gifford Pinchot and the Making of Modern Environmentalism* (Washington DC: Island Press, 2001), 338. Pinchot, friend and ally of conservation-minded President Theodore Roosevelt, was the first Chief of the United States Forest Service. He advocated using European methods of sustainable forest management in the United States, and was instrumental in making forest preservation a national concern. Pinchot was a native Pennsylvanian, and two-term governor of the state. During his long and influential career, he remained convinced that government should be used to extend the benefits of American life to all citizens. He also believed that social justice was dependent on economic expansion, and that continued economic growth depended on wise and efficient use of natural resources. Ibid., 12.

[111] Ernest Morrison, . . . *a Walk on the Downhill Side of the Log: The Life of Maurice K. Goddard* (Mechanicsburg, Pennsylvania: The Pennsylvania Forestry Association, 2000), 53-54.

Secretary Goddard's commitment to environmental conservation paradoxically motivated him to acquire gas royalties for the state. In 1955, his first year as secretary, he was instrumental in the passage of the Oil and Gas Lease Fund Act 256. Under Act 256, income from gas extracted from state land went exclusively into a special fund managed by his department "'for conservation, recreation, dams, or flood control,'" money that Goddard dedicated to the improvement and support of Pennsylvania's state park system.[112] He was inspired by a similar program in California, which used revenue from off-shore wells to rebuild that state's park system after World War II. Goddard leveraged his reputation for personal integrity and exercised his political skills to build bipartisan support for a measure that gave him considerable power. He had the authority to decide on the need and the location of any project covered under Act 256, and the power to acquire land by purchase or condemnation. He established a Mineral Division within DFW to administer gas and oil leases, although at the time only gas wells were involved. Goddard's fund received about twenty million dollars during its first fifteen years. Aside from some land purchases for state forests, he used nearly all the money to establish new state parks.[113]

Early in 1968, Erie's citizens became aware of Secretary Goddard's plan. First reactions were more negative than positive. On January 29, the Millcreek Township[114] supervisors officially opposed drilling, until they were "assured that there will be no pollution." The next day Erie County commissioners went on record opposing lake bed gas leases. The city council announced

---

[112] Quoted in Morrison, *Walk,* 75.

[113] Morrison, *Walk*, 75-76.

[114] Millcreek Township is a large and heavily populated suburban part of Erie County that abuts the city of Erie, and includes the Presque Isle peninsula. In addition to the entrance to the park, the township contains the county airport, and other important recreational and educational sites. From Millcreek Township, Erie County Pennsylvania Official Website, accessed October 1, 2017, http://www.millcreektownship.com/Home.aspx.

that they, too, would not approve the drilling unless "'there will be no pollution of the lake, nor any disturbances of fish spawning beds in Lake Erie or any tributary.'" Because nearly everyone wanted more information, local leaders planned a meeting to include DFW Secretary Maurice Goddard, mayor's assistant Joseph J. Robie, county commissioners Fred W. Lamberton and Leo P. Weir, and a number of sportsmen's club representatives.[115]

Mayor Tullio was a little slower to declare a position. A few weeks passed while the mayor waited for information from Goddard on details of the plan before reaching a conclusion. Tullio said, "I'm not going to be opposed to anything until I know the actual facts and what the results will be."[116] However, Tullio also was adamant about no pollution. In a letter to Goddard, Erie's City Solicitor James G. Hanes stated, "Mayor Tullio, of course, has an open mind on this matter . . . but he wants you to know in advance that he will strenuously oppose these drilling operations if they will lead to any pollution whatsoever which would endanger the peninsula as a tourist attraction."[117]

City and township officials, state representatives, and members of local sportsmen's clubs met with Goddard in mid-February. Goddard had two arguments to support his plan—the benefits to Erie and the safeguards to the lake. He informed the officials that royalties from lakebed gas would go into a fund to benefit state parks. Presque Isle Park, he reminded them, had already received two million dollars from that fund for infrastructure improvements and would likely receive more. Goddard reassured the Erie delegation that the proposed wells would cause

---

[115] "Robie Plans Trip, Talks on Drilling," *Times*, January 14, 1968.

[116] "Drilling Information Requested by Tullio," *Morning News*, February 1, 1968.

[117] "Mayor Seeks Facts in Lake Drilling," *Times-News*, February 4, 1968.

absolutely no pollution. The terms of the proposed lease were so restrictive that the mayor's assistant Joseph Robie expressed doubt that any gas company would actually be willing to drill under such highly regulated and probably expensive conditions. When someone asked Goddard if he would continue to offer lakebed gas leases despite strong local opposition, he side-stepped the question by asking if there would be any real opposition if civic leaders foresaw no pollution problems. Goddard emphasized some key points of the lease. Drilling waste would not go into the lake, but would be dumped on land in locations approved by the health department. The lake would receive less pollution from drilling than it did from the city sewage system. The shoreline would not become a "derrick city." A commissioner quoted Goddard, "It's humanly impossible to guarantee that there won't be pollution, but that everything will be done to prevent it." Mayor's assistant James Robie found Goddard's presentation persuasive. Robie said, "Based on his background and the interest he has shown in our Presque Isle, would this not suggest that Goddard would avoid anything that would cause pollution in the lake?" The sportsmen's club representative remained "cautious," out of concern for the "sixty-million-dollar tourist business," and concern for club efforts to revive salmon fishing. Other civic leaders acknowledged Goddard's transparency, but nevertheless wanted to wait for more information before deciding on their position.[118] Goddard was already scheduled to appear at a testimonial dinner in early March, organized by the Erie County Tourist Convention Bureau, to honor Goddard as a benefactor who promoted Erie as a beautiful place and a recreational destination. Robie suggested using Goddard's visit as an opportunity to meet and further talk over the natural gas issue.[119]

---

[118] "Advantages of Drilling," *Morning News*, February 20, 1968.

[119] "Drilling Discussion Suggested," *Morning News*, March 5, 1968.

In mid-March 1968, the Pennsylvania Department of Forests and Waters (DFW) announced that it would open bids on April 9 for leases on thirty-seven blocks of lake bottom—a total of about 370,000 acres—for oil and gas drilling. Each block could contain twenty-five wells, totaling nearly a thousand possible drilling sites.[120] Gas was the main goal, as DFW did not anticipate discovery of any substantial quantity of oil, a greater threat to the lake's ecosystem. DFW officials intended to protect the interests of all concerned, and therefore set strict conditions for drilling companies in order to prevent contamination of the lake and interference with shipping. DFW would first review drilling operational plans and retain strict control in the drilled area. It would have the authority to shut down any "operation which is a source or potential source of pollution." DFW regulations required drillers to post permanent bonds of forty thousand dollars, to post additional bonds of twenty thousand dollars for each well, and to maintain an accident and liability insurance policy of one million dollars. That money would presumably fund mandatory clean-up of any damage to the lake and shore, and compensate any people harmed. Furthermore, pipelines under shipping lanes would run on or below the bottom of the lake bed. Wells sites would be at least one mile from a public or industrial water supply, and one thousand feet from any wastewater discharge facility. The department required drillers to mark wellheads with buoys and trawler deflectors. It mandated precautions against leaks, blowouts, ice damage, and boat collisions. Regulations forbade drilling along several miles of public and private beaches, particularly Presque Isle State Park. They forbade any interference with fishing rights.[121]

---

[120] "Drilling-Bid Opening Today; Local Opponents to Meet," *Morning News*, April 9, 1968.

[121] "37 Offshore Blocks: Open Drilling Bids Apr. 9," *Times*, March 15, 1968.

Despite DFW's strongly-worded requirements and Goddard's credibility, the Erie County commissioners and sportsmen's representatives continued to oppose drilling in the lake. The commissioners cited a newsletter from the federal Water Pollution Control Administration, which reported, "The state of Ohio has called off drilling for oil and gas in Lake Erie. The fear of pollution was too great."[122] Northwestern Pennsylvania Sportsmen's Association Vice President David DeHaven, who represented members in seven counties, expressed doubt that Pennsylvania could adequately control pollution from drilling in the lake. DeHaven had attended the banquet in honor of Maurice Goddard, but was not convinced by the secretary's repeated assurances. DeHaven feared that all the efforts by sportsmen's clubs to restock local waters, especially Coho salmon in the lake, would be undone by pollution from drilling. DeHaven wondered why Ohio and New York would not grant leases off their Erie shorelines, yet Pennsylvania would.[123] The Erie County Council of Sportsmen's Clubs also played a very active role in opposing Goddard's plans. They organized yet more meetings, one with Goddard on March 21 to question him on lease details.[124] Afterwards, the Council scheduled a public meeting for April 11 to show bipartisan opposition to lakebed drilling.[125]

Erie's Democratic State Representative Frank Polaski quickly sponsored a bill on March 19, to stop DFW's plan. He reported extensive concern among Erie citizens and nearly unanimous opposition to lakebed drilling from "'all the governing bodies in Erie County, the Erie County Council of Sportsmen Clubs and the majority of people interviewed by news media.'" Polaski

---

[122] "37 Offshore Blocks: Open Drilling Bids Apr. 9," *Times*, March 15, 1968.

[123] "Sportsmen Oppose Drilling," *Morning News*, March 12, 1968.

[124] "Bill Forbids Drilling," *Times*, March 20, 1968.

[125] "Drilling-Bid Opening Today; Local Opponents to Meet," *Morning News*, April 9, 1968.

argued that Pennsylvania lacked sufficient supervisory capacity to monitor pollution from leaks and blowouts. The state, he said, would receive approximately $500,000 from rental and royalties, but would risk "destroying a $60 million tourist business as well as the major recreational facilities for 250,000 residents of Erie County." Polaski explained that Ohio had rejected plans to drill the lake based on a federal study by the Water Pollution Control Administration, and New York's plans were on hold pending a legislative study prompted by existing oil pollution in Buffalo.[126]

Sportsmen Association Vice-President DeHaven, who had already collected several hundred signatures from people opposed to drilling, requested that the county commissioners place the issue on the April 23 state primary ballot. The commissioners referred the request to their legal counsel. Another spokesman for the sportsmen's club, John D. Tarr, sent an open letter to Goddard with objections to particular provisions of the lease. Tarr feared the lack of guarantee concerning adequate pollution inspection. In Tarr's view, the Pennsylvania Department of Health (apparently charged with the task) had neither manpower nor boats to provide for even the inadequate monthly inspection schedule DFW proposed.[127]

At the end of March Mayor Tullio sent a telegram stating his objections to Governor Raymond Shafer. Maurice Goddard, local legislators, and sportsmen's organizations received copies. Tullio stated: "After a careful study of all available information, I've reached the conclusion that off-shore drilling for oil and gas in Lake Erie is not in the best interest of the City of Erie and of Northwestern Pennsylvania." He further informed the governor that "I strongly urge the Commonwealth of Pennsylvania to withdraw invitations of bids as Ohio and New York have

---

[126] "Bill Forbids Drilling."

[127] "County Asks Ruling on Ballot Question," *Times*, March 20, 1968.

done, and in the event that bids are accepted for this operation, I as the Mayor of the City of Erie, will file a taxpayers' suit to enjoin such activity." Tullio expressed "considerable doubt in my mind concerning the possibility of lake pollution and possible hazards to commercial and pleasure craft . . ." and stated "Tourism to Erie and the surrounding area stands as our number one industry."[128]

Other drilling opponents remained active. Some worked to support Representative Frank Polaski's bill to prevent DFW from offering drilling leases. Time was short. When Tullio sent his telegram, less than two weeks remained before Goddard planned to open bids on April 9. Speaking for the Erie County Federation of Sportsmen's Clubs, which unanimously supported Polaski's measure, David DeHaven described the urgency of getting the bill onto the House floor and through the reading process before the Easter recess. Although 1,500 people in Erie County had already signed anti-leasing petitions, DeHaven hoped for "10,000 signatures by mid-April." If the bill passed after April 9, it could still prevent drilling even if bids had been opened. If it failed, the next resort would be to file for a court injunction to stop the leasing of drilling plots, which DeHaven said would require soliciting contributions toward $1,000 in legal fees.[129] In early April, state Representative Wendell Good told the press he had heard that even if the bid process proceeded as scheduled, the state might delay awarding contracts pending the fate of the bill to prevent leasing, which was still in committee. Further, Good wanted hearings before the newly-formed Joint Senate-House Air and Water Pollution Study Committee, as well as more information on the effects of Canadian drilling.[130] A state convention of Federation sportsmen that represented

---

[128] "Mayor Threatens Court Suit if State Accepts Drilling Bids," *Times*, March 29, 1968.

[129] "Immediate Action Urged on House Bill," *Times*, March 29, 1968.

[130] "Drilling Bids Awarding Delayed Indefinitely," *Times*, April 5, 1968.

130,000 members in sixty-seven counties also condemned Goddard's plan. The key points of their objections, according to spokesman James Quinn, were the lack of measures to adequately inspect, detect and correct causes of lake pollution.[131] In a set-back for the activists, counsel judged that it was not legally possibly to include a referendum on the April 23 primary ballot.[132]

Goddard responded in a letter to John D. Tarr, secretary of the Erie County Council of Sportsmen Clubs. Goddard re-emphasized that drilling could be done without endangering lake water quality or tourism. The DFW, in cooperation with the Federal Water Pollution Control Administration, would be fully responsible to assure proper surveillance and adherence to the lease stipulations. He promised that a power boat would always be available for surveillance. Drillers' plans would be subject to federal and state approval, especially state departments of health, of mines and minerals, and the fish and game commission. All drilling waste would be transported to approved disposal sites on land. The operation of a non-compliant driller would be halted, his lease cancelled, and his bond forfeited to correct the problem. Goddard also declared, ". . . experience has shown that drilling operations attract fish and these sites make excellent fishing areas," and "these operations do not result in cluttering up the harbors with drilling apparatus and other craft which crowd out pleasure craft."[133]

Tarr rebutted Goddard's statements in an announcement for a planned public meeting to gather support for the work against drilling. Tarr strongly endorsed the sportsmen's council petition drive for 20,000 signatures to make state lawmakers understand that Erie County residents

---

[131] "Lake-Drilling Opponents Launch Petition Campaign," *Morning News*, April 11, 1968.

[132] "Drilling Bids Awarding Delayed Indefinitely," *Times*, April 5, 1968.

[133] "State Official Says Drilling on Lane Will Be Policed," *Morning News*, April 5, 1968.

seriously opposed drilling in the lake and supported the bill (still in committee) to halt the project. Tarr complained that Goddard "responded to specific questions about the lease agreement with generalities." He did not think the lease was tight enough and had several objections to Goddard's assurances. Tarr said that the state did not own the type of boat needed for surveillance, and the lease did not require the driller to furnish one. He could not find any provision empowering the Department of Health or the Fish and Game Commission to halt a polluting drilling operation. If a polluting accident occurred, the lease only required notification to DFW, not to local officials. Tarr declared, "Finally, no one, not even Dr. Goddard, can guarantee us that there will be no pollution."[134] That last is of course true. The exchange seemed to be a battle of rhetorical positions.

Despite efforts to the contrary, DFW opened bidding for drilling leases as scheduled on April 9. State government sources indicated that contracts were not expected to be "immediately" awarded, but they provided no information on when that might happen. Polaski's bill remained stuck in committee when the legislators left for Easter break.[135] In response, the Erie County commissioners passed a unanimous resolution to aid drilling opponents who were collecting petition signatures in support of another state bill to transfer authority for leasing drilling rights from DFW to the Department of Health. Petition papers were widely available at city hall, local fire houses, and other public buildings. Drilling opponents needed 20,000 signatures to advance the bill out of committee and on to the legislature's floor. [136] Mayor Lou Tullio filed suit for a permanent injunction against drilling leases from the state court; a hearing was scheduled in

---

[134] "Foes of Drilling Slate Meeting," *Times*, May 8, 1968

[135] "Drilling-Bid Opening Today; Local Opponents to Meet," *Morning News*, April 9, 1968.

[136] "Drilling Petitions Available," *Morning News*, April 18, 1968.

Harrisburg for April 17, 1968. The suit would prevent DFW from leasing any lake-bed drilling rights, on the grounds that drilling would threaten Erie's drinking water supply, and its commercial fishing and tourism industries. Two companies had already sent bids to DFW: Ranger Oil Company of Alberta, Canada, bid $10,242 for one block; Pan-American Petroleum Company, Fort Worth, Texas, bid $3,029, $21,376, and $93,382 on three blocks. These bids were on hold at least until the suit was settled.[137]

The relationship between Maurice Goddard and the citizens of Erie remained complicated. An unsigned editorial article in Erie's Times had the lead line: "Isn't it time to call a halt to the growing dispute between the city and the state over the oil and gas drilling in Lake Erie?" The article called Goddard "a proven friend," and declared that Presque Isle was "as much the handiwork of Dr. Goddard as any other human being." For the editor of the Times, Goddard's pride in and commitment to the park was proof of his assurances regarding the negligible impact of drilling on the region. The editorial claimed that Erie would only be the loser if city officials seriously alienated Goddard by enacting measures to obstruct the onshore transportation of gas and oil from the lake. In that case, there would be small likelihood of further state-funded investment in the peninsula. The editorial called for the city to accept Pennsylvania Commerce Secretary Clifford Jones's offer to mediate the dispute, in hope that he could reach a compromise by altering lease terms to better reassure city leaders. At least initially, that attempt to bring Tullio and Goddard together was fruitless.[138] Nevertheless, the county commissioners, who supported

---

[137] "Hearing on Drilling Suit Scheduled for April 17," *Morning News*, April 10, 1968.

[138] "Erie Could Be the Loser," *Times*, April 30, 1968.

Tullio's suit and remained strongly opposed to drilling, stressed that this was not a "personal vendetta" against Goddard.[139]

An accident at the Hammermill Paper Company reinforced the county commissioners' uneasiness about pollution in the lake, and strengthened their resolution against off-shore drilling. A ruptured pipe associated with a Hammermill waste-disposal injection well leaked pulp waste into the lake, prompting the question of how drilling companies could control such accidents, when the paper mill, which they "commended" for its pollution control efforts, could not. The commissioners did not criticize Hammermill, or other local industries that contributed pollution to the lake. Instead, they advocated the appointment of sanitary engineers to assist with industry initiatives to curb pollution. The commissioners' tone was business-friendly. They maintained that industry leaders were willing to abide by water quality regulations, but "needed help."[140] As in the case of Maurice Goddard's lake-bed project, this was another case for official expertise; if things are done properly, problems are controllable. But the commissioners did not have the same incentive to accommodate drilling as they did local industry, which contributed to the regional economy.

On April 30, Commonwealth Court Judge James S. Bowman dismissed Mayor Tullio's request for an injunction against lake-bed drilling. The state began steps to award two lease contracts from earlier bids. At that point Tullio expressed a desire to meet with Goddard, and "'iron out problems with the lease.'" The city's Assistant Solicitor Joseph Walsh, in conference with the Mayor, contemplated plans for an appeal. Apparently in anticipation that the appeal might fail,

---

[139] "Hearing on Drilling Suit Scheduled for April 17," *Morning News*, April 10, 1968.

[140] "Commissioners Cite Dangers on Drilling," *Morning News*, April 17, 1968.

Walsh began working with other borough and township attorneys to compose legislation on the local level to control possible pollution on land fronting the lake.[141] Efforts at the state level to counter Goddard's plans ended with one last attempt by Representative Frank Polaski. In February 1969, Polaski introduced a bill to the Pennsylvania General Assembly that would amend a previous act in "eliminating the power and duty of the Department of Forests and Waters to mine or remove oil and gas beneath waters of Lake Erie owned by the Commonwealth; providing for eminent domain as to existing leases"[142] The bill was referred to the House Committee on Conservation the same day, and that was the last action on it, according to House records.[143]

Nevertheless, not all state and local stakeholders actively opposed the drilling. Some members of the business community and, surprisingly enough, tourism boosters acquiesced. At an April 30 meeting, the Erie Tourist and Convention Bureau, the Erie Chamber of Commerce, and the Millcreek Chamber of Commerce released a joint statement declaring themselves satisfied with the terms of the lease, in the belief that it would adequately protect the region's tourism industry.[144] Pennsylvania's U.S. Senator Joseph S. Clark also did not see any evidence of danger to the lake from drilling—in his view, it was the existing pollution in this most polluted of the Great Lakes that required immediate attention.[145]

---

[141] "Mayor Tullio May Appeal Results of Drilling Case," *Morning News*, May 1, 1968.

[142] General Assembly of Pennsylvania, House Bill No. 461, Session of 1969, Printer's No. 532.

[143] Pennsylvania General Assembly, Bill and Amendments, Bill Information, Regular Session 1969-1970, House Bill 461, accessed October 1, 2017, http://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?sYear=1969&sInd=0&body=H&type=B&bn=0461.

[144] "Groups Voice Drilling Support at Commissioners Meeting," *Times*, May 1, 1968.

[145] "Clark Doesn't See Drilling Danger," *Morning News*, April 22, 1968.

3.3 Federal Intervention

The drilling controversy attracted attention on the national level. Vice President Hubert Humphrey sent a telegram to Erie officials expressing the administration's commitment to protect national waters. Humphrey promised that "'top science advisors'" from the U.S. Department of the Interior would investigate Pennsylvania's Department of Forests and Waters plans for Lake Erie drilling.[146] Humphrey then telephoned Erie County Commissioner William Hill Jr., again promising a federal study of the issue.[147] Chairman of the Federal Water Pollution Advisory Board Max N. Edwards independently planned a hearing in Pittsburgh to consider water quality issues in Lake Erie, although his main concern was acid coal mine drainage. Erie was well-represented at the hearing. Sitting on the federal board was Everett F. Zurn, a major Erie industrialist whose company (still in existence) manufactured plumbing and other water-related items.[148] At least some of the Erie commissioners attended.[149] The Erie County Federation of Sportsmen Clubs also sent representatives, equipped with their own report on water pollution. The Federal Water Pollution Control Administration determined that Erie was the most polluted of the Great Lakes. It judged that the poor water quality already affected tourism, fishing, drinking water and other uses vital to Erie.[150]

---

[146] "U.S. Studys [sic] Lake Erie Drilling," *Morning News*, April 2, 1968.

[147] "15,600 Sign Petition Against Lake Drilling," *Morning News*, April 25, 1968

[148] Zurn Industries, LLC, Official Website, updated 2017, www.zurn.com.

[149] "Groups Voice Drilling Support at Commissioners Meeting," *Times*, May 1, 1968.

[150] "Sportsmen Preparing for Pollution Board," *Times*, May 15, 1968.

Maurice Goddard provided testimony at the hearing as well. He was a former member of the President's Water Pollution Advisory Control Board. Although Goddard described his experience in serving on the board as "'one of the best, most constructive experiences of my life,'" he nevertheless strongly criticized federal efforts to control pollution as "'inadequate, too unwieldy and too slow and its programs have been hampered by poor coordination and duplication of those already undertaken and completed by the states.'" Goddard suggested that a national-level agency, such as the Federal Water Pollution Control Administration, be responsible to consolidate and direct pollution abatement efforts. Erie's Times editor agreed with Goddard, whom he characterized as "a man with immense prestige as a conservationist."[151]In effect, Goddard, a representative of a state agency, advocated federal control.

In fact, a federal agency already had substantial power to affect plans to drill the lakebed. The United States Army Corps of Engineers (USACE) was involved in the controversy over drilling for natural gas in Lake Erie because, by law, it had responsibility for the permitting process for any activity that disturbed the bottom or erected structures in navigable waterways. At the time when DFW began to accept bids for drilling leases, the Corps had a century of history as an institution that supported economic development. However, in the late 1960s, USACE's mission was undergoing serious change. USACE began to take environmental impact into account when evaluating the projects under its jurisdiction. This change was a significant departure for the Corps, which long had an adversarial relationship with environmental organizations. As conservationist and preservationist activism increased over the course of the twentieth century, even before passage of the 1970 National Environmental Policy Act, the Corps evolved different approaches

[151] "End the Duplication," *Times*, May 28, 1968.

to planning and programs.[152] Conservationists both within and outside the government had pressured the Corps into expanding the factors it used to evaluate a project, which were traditionally limited to economic, engineering, and hydrological concerns. In 1967 the Secretaries of the Army and the Interior issued a joint directive that required USACE to inform agencies responsible for environmental protection about the permits USACE was considering. [153]

However, before the USACE could begin the evaluation and permit process for drilling Erie's lake bed, Pennsylvania Governor Raymond Shafer stopped the whole project. In 1969, Shafer signed a moratorium on drilling for gas or oil in the state-controlled portion of Lake Erie. Shafer's action was a response to a larger national awareness of the dangers of off-shore drilling, caused by the Santa Barbara Oil spill.[154] That spill, caused by an oil rig blowout off the California coast on January 28, 1969, was part of the inspiration for Gaylord Nelson's first organized Earth Day in 1970. The Santa Barbara spill, like the publication of Rachel Carson's Silent Spring and the day in 1969 when the Cuyahoga River caught fire, was a key event in the beginning of the modern environmental movement. It helped inspire the unprecedented amount of federal environmental regulation passed in the early 1970s.[155]

Nevertheless, Governor Shafer's moratorium was not the end of Pennsylvanian efforts to extract gas from under Lake Erie. In the 1970s, the energy crisis changed the focus of the debate.

---

[152] Michael C. Robinson, "The Relationship Between the Army Corps of Engineers and the Environmental Community, 1920–1969," *Environmental History Revue* 1989; 13 (1): 1-2.

[153] Ibid., 15-16.

[154] Joint Legislative Air and Water Pollution Control and Conservation Committee, "Public Hearing on Natural Gas Drilling in Lake Erie," March 3, 1977.

[155]Adam Rome, *The Genius of Earth Day: How a 1970 Teach-In Unexpectedly Made the First Green Generation* (New York: Hill and Wang, 2013).

Rather than just supporting Goddard's state park projects, gas from Erie would arguably help to alleviate pressing national fuel shortages. Pennsylvania, as well as Ohio and New York, lifted their bans. Federal legislators and agencies paid renewed attention to Lake Erie's gas reserves. For example, in 1977 the bipartisan Joint Legislative Air and Water Pollution Control and Conservation Committee held a hearing to explore the potential of lakebed gas.[156] In 1978, USACE in cooperation with the Great Lakes National Program Office of the U.S. Environmental Protection Agency began a four-year study on the subject. USACE commissioned a report from an independent organization, Argonne National Laboratory. The purpose of the report was not to make recommendations, but to explore the issues involved and predict possible benefits and problems. [157]

Local input was part of the study process. The environmental impact statement by Argonne Lab was initially released in draft form, without a decision on whether or not drilling permits should be issued, to allow the public comment period required under the National Environmental Protection Act.[158] Then USACE would issue a final report that incorporated comments. Following another 30-day comment period, they would then make a decision. Erie's Times published instructions on how to obtain a copy of the draft, and the address to which citizens could mail comments.[159]

---

[156]Joint Legislative Air and Water Pollution Control and Conservation Committee, "Public Hearing."

[157] "Lake Erie Clear for Gas Drilling, Engineers Report," *The Pittsburgh Press*, June 30, 1982.

[158] D. L. McGregor, *An Examination of Issues Related to U.S. Lake Erie Natural Gas Development* (U.S. Army Corps of Engineers, Buffalo District and the U.S. Environmental Protection Agency, Great Lakes National Program Office, 1982).

[159] "Impact Study Released on Gas in Lake Erie," *The Times*, November 17, 1981.

The results of the initial study draft indicated that the residents of Erie would not benefit to any great extent from gas extracted from the lake. During the natural gas shortage in the bitter winter of 1977-78, when natural gas was rationed according to the type of usage, the most severely curtailed deliveries in the ten-county study area were to industrial users in Ohio—99 percent of curtailment by volume. The most significant economic benefit of drilling in the lake would result if the increased production was channeled to industrial users. Residential consumers in Pennsylvania supplied by the National Fuel Gas Distribution Corporation were affected very little. If lakebed gas was added to state reserves, the increase in natural gas reserves for Pennsylvania was estimated at about 11 percent, compared to 49 percent for Ohio and 68 percent for New York. The study also revealed that intrastate gas prices doubled and tripled between 1972 and 1978 in the study area. Pennsylvania intrastate gas increased by 245 percent during those six years.[160] In other words, Erie's consumers would pay much more for gas produced locally. Erie's state assemblymen had a mixed reaction to the USACE report on the potential financial benefits to PA from gas drilling in the lake. The assemblymen were not necessarily against drilling, but stressed the need for strict environmental safeguards to protect the lake. They wanted to go slowly with the project, and wanted proof that drilling would not pollute. With the smallest shoreline of all the bordering states, Pennsylvania stood to gain the least—an estimated $240 million spread over thirty years. On one hand, that's a sizeable sum. On the other hand, as Assemblyman Harry Bowser expressed, "'$247 million? That's not enough money to buy us a new lake.'" [161]

---

[160] This rise resulted from the complications of gas pricing policy. Federal price controls applied to gas in interstate commerce.

[161] "Solons Cautious on Lake Drilling," *Morning News*, December 29, 1980.

The United States Army Corps of Engineers released the final report in 1982, which approved drilling for natural gas under Lake Erie, although with some caveats. USACE did not approve drilling in an area on the western end of the lake, where the risk of encountering petroleum instead of natural gas was too great. While USACE found no compelling reason to prevent gas drilling, it listed some potential problems. Drilling would certainly disturb toxic sediments on the lake bottom, at least temporarily. Accidents to drilling equipment and infrastructure were another danger because capsized rigs or ships would deposit hazardous material in the water, air, and on the lake bottom, including "chrome lignosulfate, barite and hydrogen sulfide." Broken gas pipelines carried the risk of explosion and contaminated drinking water supplies. Gas from submerged leaks could increase the amount of polyethylene glycol in the water. That chemical could react with water treatment methods in municipal plants to produce suspected carcinogenic trihalogenated methanes.[162] Based on the study, USACE engineers concluded that it was possible to drill for gas "in an environmentally acceptable manner," assuming that strict controls would limit environmental impact. USACE, which had the authority to approve or deny drilling permits, did not specifically recommend drilling in the lake. It would be up to the states to pursue development. In any case, when the final study was released, no permit applications had yet been filed with USACE.[163]

---

[162] "Report approves drilling for gas in Lake Erie," *The Pittsburgh Post-Gazette*, March 15, 1982.

[163] *Final Programmatic Environmental Impact Statement: U.S. Lake Erie Natural Gas Resource Development* (U.S. Army Corps of Engineers, Buffalo District and the U.S. Environmental Protection Agency, Great Lakes National Program Office, 1982).

3.4 Conclusion

With by far the smallest shoreline along Lake Erie of any state or Canadian province, Pennsylvania had the least area for potential gain from drilling the lake. If the state would benefit relatively little from royalties, consumers in Erie would benefit not at all. The proposed drilling project did not include plans to connect to local supply lines. Even if it did, the lake gas supply would be priced as intrastate gas, which at that time was as much as ten times as expensive as interstate gas delivered from the southwest. It would certainly not benefit consumers struggling with their heating bills. Therefore, any negative impact to the lakeshore environment would not be offset by a substantial benefit to its inhabitants.

In the end, none of the local Erie efforts—the grassroots petition campaign, pressure from the large voting block represented by Pennsylvanian sportsmen's organizations, the vigorous opposition of the mayor and city council, the township supervisors' resolutions, the mayor's suit in Commonwealth Court for an injunction, Polaski's proposed legislation—appeared able to halt Maurice Goddard's plan to extract natural gas offshore in Lake Erie. It took an unexpected environmental disaster of national importance to kill the project, just at the moment when it was about to begin. Goddard's conservationist philosophy was overtaken by the new national environmental consciousness. The word 'progress' had begun to lose its halo, and progressive-era faith in technological expertise had waned. When presented with the images of seabirds drowned in oil on a previously paradisiacal stretch of California coast, the public position shifted from interest in the conservation of useful resources toward the preservation of wild nature. At least, the degree of that shift was enough to permit passage of fundamental environmental legislation on the federal level.

Erie's leaders and citizens defended their commons—their shared interest in the preservation of Lake Erie's ecosystem and natural beauty. They shared an identity built on place and their pride in it. Like other communities in many places and times, Erie's people and economy depended to some degree on benefits from natural resources they did not own or control. They had the least power and the most to lose from the state's appropriation of those resources. Despite Maurice Goddard's immense reputation as a conservationist, he never managed to allay fears that gas drilling in the lakebed would have a severe impact on Lake Erie and Presque Ilse. The cautious approval of the USACE, accompanied by detailed descriptions of possible dangers and few benefits, was not very reassuring. Local defense of the lake at least prompted federal investigation of the issue, one factor in establishing a federal ban on drilling in the Great Lakes.

There are no gas wells in Pennsylvania's share of Lake Erie's bed. Currently there is no state law against it. The most recent federal ban to effectively prohibit drilling in the Great Lakes was an executive order from President Barack Obama, a response to serious concerns about all off-shore drilling prompted by the disastrous 2010 Deepwater Horizon spill. However, the idea of drilling in the Lake Erie bed, or in any of the Great Lakes, never really went away. On June 19, 2018, President Donald Trump signed "Executive Order Regarding the Ocean Policy to Advance the Economic, Security, and Environmental Interests of the United States," which rescinded Obama's order, and emphasized the economic "entrepreneurial" role in water policy and resource management. Natural gas industry spokesmen hailed the measure.[164]

---

[164] National Ocean Policy Coalition, "Groups Around the Country Applaud New Executive Action," June 22, 2018. Accessed November 8, 2018. http://oceanpolicy.com/2018/06/22/groups-around-the-country-applaud-new-executive-action/

4.0 Erie: Drilling the Land

Natural gas drilling in Erie, Pennsylvania has had a long-lasting influence on the state's natural gas policy and on the drilling technology that fostered the Marcellus gas phenomenon. In the 1970s and 1980s, Erie experienced a local drilling boom. Unlike the civic action to defend their common interest in Lake Erie from gas extraction, the land boom displayed the classic characteristics of Garrett Harding's tragedy of the commons. Local actors bitterly contested for the right to drill before the gas was all gone. That fight demonstrated the acute need for new drilling regulation. Erie's gas field became a setting that displayed the interaction of federal, state, and local power in environmental policy-making. Local citizens, with the most to gain or lose, were least able to establish control. Chapter three covers the course of the boom, including the impact of high energy prices on the Erie's citizens, the self-help measures they took, and their futile appeals for federal relief. It shows the relationship between federal regulation, local policy, and subsequent state action that produced the Pennsylvania Oil and Natural Gas Act of 1984, the principle regulatory framework for the state's twenty-first century Marcellus shale fracking boom.

Federal action first motivated Erie's gas boom. As part of the response to the 1970s energy crisis, the administration under President Jimmy Carter reacted to a natural gas shortage by passing the 1978 Oil and Gas Act, intended to incentivize new drilling by eliminating price controls. The 1978 Act deregulated gas prices in a complicated way that left Erie, a gas-rich region, struggling to pay for heat. Heating costs were a significant added burden in a region where private citizens and municipal organizations were already coping with rust-belt deindustrialization. Then, in keeping with his economic policies to reduce government spending, President Ronald Reagan (1981-1988) proposed federal funding cuts for social safety nets, including heating subsidies. Erie's elderly and

poor citizens were object lessons illustrating the impact of gas deregulation and Reagan's federal policies.

The heating cost crisis, as well as the gas shortage itself, reinforced the perception that solutions to the energy problem depended a great deal on local efforts. Many Erie institutions and some citizens began drilling private-use gas wells, with serious infighting over who would control and benefit from these wells. The state of Pennsylvania, reacting to the upsurge in gas drilling caused by the energy crisis and deregulated prices, eventually passed the 1984 Oil and Gas Act, which provided at least some protection from the impact of drilling on people and the environment. The gas-drilling surge in Erie's distinctive geology also helped develop the new 'fracing' technology (as it was initially spelled)—hydraulic fracturing. Two decades later, the provisions of the 1984 Pennsylvania Oil and Gas Act still regulated gas drilling at the beginning of the Marcellus shale gas boom, made possible by the use of what we now refer to as fracking.

4.1 Erie Gas in National Context

The gas boom of the 1980s was not the first in Erie, which had rich reserves of natural gas, early prominence in the gas industry, and a long-established precedent for gas wells drilled for local use. The first commercial deep gas well in the United States was drilled near Erie in 1854. In the 1860s, Erie had the first identified production field, or "gas pool," recorded in Pennsylvania, and an Erie brass-works became the first industrial-scale user of gas in the country. By the 1870s, Erie's streets were gas-lit, and gas fueled the town water works, a number of businesses, and some

homes.[165] City authorities planned to drill their own wells to power government facilities. An 1870 letter to a local paper titled "Erie's Big Card" claimed that Erie had an advantage over Pittsburgh for manufacturers, because the natural gas "under our feet" was so superior to coal for industry.[166] However, the first industrial-scale gas boom in the late nineteenth and early twentieth centuries did not last. Throughout western Pennsylvania, early shallow wells ceased to be productive, and the majority of heavy industries and many domestic consumers once again relied on coal. Not until after World War II, when pipelines began to transport gas to the northeastern United States from the southwestern oil fields, did coal use again decline in favor of natural gas.[167]

Despite piped-in supplies, by the 1970s natural gas was viewed as a scarce commodity, likely to get even more scarce. In 1973, when the first oil and gasoline shortages were contributing to a national panic, natural gas was in very short supply in some parts of the United States. The shortage was significant because natural gas then furnished about one-third of the energy used in the country. Continued shortages of gas during the cold winters of 1977 and 1978, especially in the Northeast and upper Midwest, resulted in significant hardships for residential and industrial customers. People could not heat their homes, and an estimated two million people were affected by factory closings and layoffs due to gas shortages.[168]

---

[165] Waples, *Natural Gas Industry in Appalachia,* 14.

[166] Waples, *Natural Gas Industry*, 178. By the mid 1880s, Pittsburgh manufacturers were converting to natural gas from wells near the city.

[167] For a detailed examination of the energy transitions between coal and natural gas in another section of western Pennsylvania, see Tarr and Clay, "Pittsburgh as an Energy Capital: Perspectives on Coal and Natural Gas Transitions and the Environment," In *Energy Capitals: Local Impact, Global Influence*, edited by Joseph A. Pratt, Martin V. Melosi and Kathleen A. Brosnan (Pittsburgh: University of Pittsburgh Press, 2014) 5-29.

[168] Graetz, *End of Energy,* 98.

Previous federal policy had undeniably contributed to the gas shortage. As a clean-burning source of power, natural gas has many advantages over oil and coal, but it is more difficult to transport than the other fossil fuels. Because of the expensive and permanent infrastructure required to transport gas—pipelines—this energy source had historically been regulated as a public utility and natural monopoly. In the first few decades of the twentieth century, the monopolies of pipeline supply allowed just four companies to control about two-thirds of the nation's interstate gas supply. In order to protect consumers from monopolistic price gouging, the 1938 Natural Gas Act gave the Federal Power Commission (FPC) the right to regulate the prices that gas companies could charge.

In the 1950s, the FPC began to regulate gas prices on a complicated regional cost-of-production basis. The details of this regulation kept natural gas prices low enough to encourage consumer and industrial demand. Unfortunately, it also inhibited new production. Further, the regulations tended to keep gas sales within the states where the gas was produced and discouraged interstate sales. FPC, a federal agency, could only regulate gas in interstate commerce, not gas produced and consumed within the same state. For a long time, this problem of jurisdiction made gas prices very different for interstate vs. intrastate gas, which resulted in uneven distribution. Even in the 1970s, plenty of natural gas was available in Southwest oil and gas fields, but the Northeast and upper Midwest were suffering. The Natural Gas Policy Act of 1978 began the deregulation of natural gas prices, which would be fully deregulated by 1985. The Act's authors intended it to allow national market forces to set gas prices at the well head, and to better balance supply and demand.[169] Deregulation and rising gas prices did stimulate exploration and production, causing increased interest in drilling in Pennsylvania and adjacent Appalachian

---

[169] Graetz, *End of Energy,* 101-104.

regions. It also caused a significant increase in consumer prices. Erie served as a case study for federal policy-makers studying the effects of deregulation.

During the energy crisis of the 1970s, with its shortages and the significant rise in all energy costs, and particularly after passage of the 1978 Oil and Gas Act, natural gas prices rose dramatically. Erie was particularly hard-hit by economic downturn, energy shortages, and harsh weather. Many public institutions and private citizens in Erie County had their own gas well drilled. Compared to the significant local opposition to drilling in the lake bed, Erie's leadership showed great willingness to drill within the built areas of the city and county. The local land wells were of most benefit to organizations and municipal agencies, because the expense of drilling made a gas well out of reach for many (although not all) private home owners.

Reaction to the unexpectedly high production of the first of these wells followed Garrett Hardin's classic theory of the "tragedy of the commons."[170] Various well-owners tried to maximize their individual gains, fearing that the gas pocket under the town would soon run dry. When the Erie school district tapped a highly productive 'bonanza' gas pocket, more organizations quickly sank their own wells. When these organizations attempted to sell gas to the local gas company, it became more difficult to sort out individual gain and public good. A hotly debated city ordinance established some limitations on zoning and usage of wells. Controversy remained high concerning whether or not commercial wells—those that sold to National Fuel Gas, the regional commercial distributer—should be permitted within the city. Opposition to local policy

[170] Hardin used the example of sheep grazing a common meadow. Each sheep owner attempts to maximize his individual gain by grazing as many sheep as possible, which soon depletes the grass, a community resource. Garrett Hardin, "The Tragedy of the Commons," *Science*, Vol. 162, No. 3859 (13 December 1968), pp. 1243-1248.

centered on some environmental concerns, but more on private property rights, and accusations of conflict-of-interest problems and possible profiteering.

4.2 Erie's Pro-Drilling Motivators: Poverty, Energy, and Reaganomics

Erie's most vulnerable citizens did not benefit from the local gas initiatives. They suffered not only from the deregulation of gas prices, but from a substantial shift in general federal policy after the election of President Ronald Reagan. Federal energy policy, combined with federal neoliberal philosophy, contributed to the persistent drilling-friendly climate in Pennsylvania. The combination of federal policy, energy costs, and rust-belt poverty reinforced the local inclination to favor gas extraction, as part of self-reliant strategies to solve local problems.

In the 1970s and 1980s, heating bills were the most serious financial issue for many people, and therefore a political issue as well.[171] Under President Ronald Reagan (1981-1988), federal policy emphasized privatization of resources and reliance on market forces. Energy policy called for reduced environmental regulation and expanded energy extraction. Reagan argued that letting "the forces of the marketplace work without undue interference, the ingenuity of consumers, business producers, and inventors" would solve the country's energy problems.[172] In addition, the Reagan administration pushed for cuts in federal aid to a variety of social welfare programs, including energy assistance. Under the threat of funding cuts, local and state agencies charged with

[171] Heating costs then were analogous to health-care costs today, in terms of their outsized impact on household finances.

[172] Graetz, *End of Energy,* 150.

implementing energy assistance programs did not know what their budgets would be from year to year, which hindered efficient operation and left recipients feeling even less secure.

The consequences of soaring energy costs were very difficult for Erie's elderly and poor. Federal representatives recognized Erie's importance as a case study on energy costs and poverty. They conducted local hearings that underscored the urgent need for federal aid, which President Reagan's economic policies made harder to get or to depend on. Federal representatives held two hearings in Erie County to investigate the connection between energy and poverty under rapidly changing economic and regulatory circumstances. The first hearing was before a Senate Special Committee on Aging in 1982, "Energy and the Aged: The Widening Gap." The second was two years later, initiated by members of the House of Representatives Committee on Government Operations. The testimony at these hearings showed that the elderly and poor were often forced to choose between heat and food. Some froze to death in their homes. They desperately needed relief from high heating costs, and looked for federal solutions—naturally enough, because the federal government had the most power to influence energy markets and the most resources to provide financial aid.

Bob Lathrop, Erie Director of the Pennsylvania Public Interest Coalition, directly connected harsh economic conditions overall, the special problems of energy costs, and the effects of deregulation under 1978 Natural Gas Act. Lathrop criticized Reagan's "New Federalism"[173] policy, which he thought shirked a national responsibility concerning energy supply and price that

---

[173]The "New Federalism" was a policy of devolving the responsibility for government programs from the federal level to state and local control. Reagan proposed awarding general purpose block grants to states, which would replace previous "categorical grants," that funded specific projects under federal control. However, although the states got increased control, they also got less money. See "Reagan's 'New Federalism'," *Editorial Research Reports 1981*, vol. I (Washington, DC: CQ Press, 198): 249-268, http://library.cqpress.com/cqresearcher/cqresrre1981040300.

could not be addressed only at the local or state level. Nationally, from 1972 to 1980 the Consumer Price Index doubled, while energy costs tripled. Lower income households spent a disproportionate and increasing share of income on heat. Close to half of low-income houses lacked insulation, storm windows and doors, and thermostatic controls. Concerning price deregulation, Lathrop protested:

> Since the passage of the Natural Gas Policy Act of 1978 we have seen natural gas costs rise at approximately a 20 percent annual rate. Here in Erie, the rise in gas costs has been virtually the same. If this wasn't bad enough now we have to weather the continued threats of the Reagan administration, as well as the major oil companies, to accelerate decontrol of natural gas. This could be one of the most disastrous measures to hit the entire economy in decades. In short, it would probably double consumers' gas bills . . .[174]

In 1982, the U.S. Senate Special Committee On Aging met at Gannon College with members of the Greater Erie Community Action Committee, the Erie County Council on Aging, and Father Vincent Enright and Sister Carolyn of the Coalition for Human Dignity. Senator John Heinz of Pennsylvania was chair. Heinz wanted evidence to support the funding of energy assistance in the fiscal 1982 federal budget. President Reagan had proposed serious funding cuts for heating assistance and home weatherization, although current programs were already inadequate to meet the extensive need. In addition to his stated agenda to increase federal aid, Heinz also hoped to enlist the local community and industry leaders to compensate for the shortfall, whatever the outcome of the budget vote.[175] According to Heinz, and some local authorities, Erie

---

[174] "Energy and the Aged: The Widening Gap," Hearing before the Special Committee on Aging. (United States Senate, 97th Congress, Second Session. Erie PA, February 19, 1982), 43-45.

[175] "Energy and the Aged," 2.

had better-than-average cooperation among community action agencies to avoid duplication of services and not let people "fall through the cracks."[176]

Heinz stressed the need for policy-makers to visit communities and see what was happening on the ground and get beyond statistics. His statistics were bad enough. In the United States as a whole, the average household spent 10 percent of its income on heating fuel. But the elderly poor in the northeast spent on average between one-third and one-half of their income for heat. Conservation of energy by weatherizing homes was an option for those who could afford renovations. However, poor people shut off rooms, used make-shift coal stoves and kerosene heaters, chose between heat and food, and sometimes died of hypothermia.[177] The national officially-reported number of those who died from cold in 1977 was 1,000. However, according to the report, the true number could be closer to 25,000.[178] Previously, during the Carter administration (1977-1981), the federal government had attempted to mitigate the effect of rising fuel prices. Legislators had enacted a windfall profits tax on the oil industry to fund energy assistance for low-income households. However, existing funding levels only served a fraction of the need. As part of "The New Federalism" policy, the Reagan administration proposed cutting assistance by over 20 percent, from $1.8 billion to $1.4 billion.[179] It also proposed eliminating funds for weatherization.[180] One participant in the hearing, the Reverend Vincent L. Enright,

---

[176] Ibid.," 31.

[177] Ibid., 2.

[178] Ibid., 3.

[179]The "New Federalism" was a policy of devolving the responsibility for government programs from the federal level to state and local control. Reagan proposed awarding general purpose block grants to states, which would replace previous "categorical grants," that funded specific projects under federal control. However, although the states got increased control, they also got less money. See "Reagan's 'New Federalism'," *Editorial Research Reports 1981*.

[180] "Energy and the Aged," 3.

Department of Community Action in Erie, harshly criticized funding cuts under Reagan's policy. Enright pleaded for the continuance of social services programs that grew out of the Depression era. He called the New Federalism "juvenile and simplistic," in regards to reality of people's needs, merely "a showcase."[181]

Senator Heinz intended to demonstrate the widening gap between legitimate need and dwindling aid. His witnesses included local officials such as Erie County Coroner Merle Wood and Erie's Energy Assistance Coordinator Victor Rutkoski. But first, Heinz called Mrs. Katheryn Grygo and Mrs. Mildred Kline to represent ordinary residents of Erie. The two women were typical of those who depended on federal help. Both were older widows living alone. One was ill, and therefore unable to care for herself very well. The other helped herself to the best of her abilities. Mrs. Katheryn Grygo lived on a fixed Social Security income and received some rent and energy assistance. Her house had some weatherization work done under the energy program, but not enough. Grygo's attic and basement needed insulation, but program workmen told her that there was not enough funding to do all the work promised to her. Mrs. Grygo had arthritis and other medical conditions, which made her very sensitive to the cold and added to her expenses. Her doctor advised moving to a warmer climate, which she could not afford to do. She depended a great deal on energy assistance.[182] If she lost the heat subsidy, she said she would be "desperate."[183]

The second witness, Mrs. Mildred Kline, had been a widow for twelve years. She was entitled to 82 percent of her late husband's Social Security income, and had a small amount saved

---

[181] Ibid., 43.

[182] Ibid., 3-4.

[183] Ibid., 13.

for emergencies. Mrs. Kline economized by making her own clothes, buying the least expensive food, and socializing only in non-expensive ways. She kept her home daytime temperature at 68 degrees, 55 at night. She conserved energy by closing off rooms, using storm windows and weather-stripping, and keeping a low setting on the hot water heater. She budgeted ahead to allow for months when the heating bill was high, and to cover the gap before heating assistance arrived. Her adult children had moved away for jobs, like many others from Erie, and so could not help with needed home repairs. Mrs. Kline had received energy assistance for two years. Without it, her only choices were to cut back on food or to deplete her savings, leaving nothing for medical or other emergencies.[184] Her income was $403 per month.[185] In the early 1980s, United States median household income was about $22,390.[186] Someone working full-time for minimum wage earned about $7,000 annually.[187] Mrs. Kline was living on $4836.

County Coroner Merle Wood testified about the causes and dangers of hypothermia, and explained that elderly and ill-nourished people were most vulnerable. He listed several case histories from Erie County. Neighbors found one woman in coma with an internal temperature of sixty-four degrees. She survived, but suffered the amputation of gangrenous limbs. Another woman aged fifty-six with rheumatoid arthritis died of exposure in her poorly heated trailer. Three such deaths had recently occurred in Erie County.[188]

---

[184] Ibid., 4-5.

[185] Ibid., 4-5.

[186] United States Census Bureau, "Money Income of Households, Families, and Persons in the United States: 1981," March 1983 Report Number P60-137. https://www.census.gov/library/publications/1983/demo/p60-137.html.

[187] Based on the minimum hourly wage of $3.35, from United States Department of Labor, Wage and Hour Division, History of Federal Minimum Wage Rates Under the Fair Labor Standards Act, 1938 – 2009, accessed October 17, 2017, https://www.dol.gov/whd/minwage/chart.htm.

[188] "Energy and the Aged," 6.

Testimony from local aid organizations covered the changed federal policy regarding social safety nets. In some instances, the testimony reported a reluctance on the part of older people to accept what help was available, reflecting a long-standing local ethos of self-reliance. Erie County Board of Assistance Energy Program Coordinator Victor Rutkoski discussed details of the program and problems of administering it. Over the previous five years, requests for assistance had increased four-fold. The amount of federal funding for energy assistance varied from year to year, and funds were not available until late in the heating season.[189] Rutkoski's office had received over 5,000 applications that year; by February his staff had only processed half.[190]

The National Fuel Gas Distribution Company (NFG), Erie's retail natural gas supplier, did not take much responsibility to aid their customers, or identify those at most risk. NFG initiated a number of policies to mitigate the crisis, which nevertheless could not address the basic problem of soaring cost. For the cost issue, NFG recommended federal action, but appeared to agree with the Reagan Administration that rigorous standards must limit who could qualify for assistance. Charles A. Wood, NFG administrative assistant for the Department of Public Affairs, and NFG Vice President William J. Hill presented the company's policies to help those swamped by heating expenses. The policies included averaged monthly payments (a new thing at that time), third party notification of termination, and a below-cost energy audit of the home. The elderly and disabled policy included no shutoff for non-payment between November and April, no late penalty for payment after receipt of Social Security or pension checks, and a no-cost but less-extensive energy audit. NFG's medical hardship plan stipulated no shutoff in a medical emergency, or where life-sustaining equipment was needed. NFG provided brochures with information on public and private

---

[189] Ibid., 18-19.

[190] Ibid., 30.

sources of possible energy assistance to senior citizen centers and to individuals that already had service terminated.[191] Wood recommended that the federal government increase funding to cover everyone eligible, time the distribution of payments better, improve outreach to inform citizens of benefits, keep eligibility guidelines simple, but only fund the "truly needy."[192] Nevertheless, NFG spokesmen stated that the company could not take on the job of identifying who may be at risk—they didn't keep records of customers' ages, for example.[193] NFG also continued to send alarming shut-off notices even in winter, a requirement of the Public Utilities Commission.[194]

Conditions in northwestern Pennsylvania were no better during the winter of 1983-1984. Consumers faced hardship in the face of recession and high unemployment, and industry that remained in the area was under similar pressure. The issue was the pricing structure of the 1978 Natural Gas Policy Act. Gas was plentiful in northeastern Pennsylvania, but people were suffering from high prices because the Gas Policy Act had created many different classifications of natural gas, based on the depth and age of the well, and where it was located. All of these categories were priced differently. Once again, federal representatives chose Erie to hear testimony that addressed new proposed Federal gas regulation to alleviate some of the hardship. An implied take-away, not directly stated by the attendees, was that Erie needed more cheaply priced locally-produced gas.

On February 13, 1984, the Committee On Government Operations and the Commerce, Consumer, and Monetary Affairs Subcommittee met near Erie in Warrenton, Pennsylvania. The Committee planned to investigate the causes and the impact of rising prices in the midst of lower

---

[191] "Energy and the Aged," 24-28.

[192] Ibid.," 29.

[193] Ibid., 24-28.

[194] Ibid., 29.

demand and a gas glut, and an appropriate federal and state response. The committee wanted to determine if gas prices should be deregulated, reregulated, or kept under current controls. Representatives of state and federal government, industrial and residential consumers, and the gas industry attended. Testimony covered many of the same issues as the hearing two years previously. Congressmen William F. Clinger and Tom Ridge of Pennsylvania, as well as the other committee members, addressed the serious problem of a 20 to 40 percent rise in natural gas prices during a time of high unemployment. Congressman Clinger described the situation:

> Senior citizens on fixed incomes, farmers, small industry, low income individuals, and the unemployed were particularly hard hit, and this year, with the frigid temperatures we have been experiencing—thank heavens not so frigid this morning—these groups among others continue to be affected. For many the disastrous choice has been between heating and eating. Nationally, heating bills were up 41 percent during the December 1983 cold snap, costing Americans nearly $1.8 billion more than usual to stay warm during the last 2 weeks of last year.[195]

William Orzechowski, director of the North Central Pennsylvania Office of Human Services (a private non-profit recognized by the state as an area agency on aging) submitted a survey on regional hardships caused by high heating costs, which provided more specific data, and reinforced the testimony of the 1982 hearing. As shown previously, low income residents in Orzechowski's service area went without other necessities to pay for heat. They still risked hypothermia, which their health care providers often failed to diagnose. Gas costs rose much faster

---

[195] Federal Response to Rising Natural Gas Prices in Northwestern Pennsylvania: Hearing Before a Subcommittee of the Committee on Government Operations, House of Representatives, Ninety-eighth Congress, second session, February 13, 1984. United States. (Washington: U.S. G.P.O.,1984): 2. http://hdl.handle.net/2027/pur1.32754075439392.

than Social Security cost of living adjustments. Available aid was inadequate. The reluctance of many to accept aid, out of pride in their self-reliance, caused Orzechowski to advocate regulation that would stabilize gas prices at a moderate level, and place the burden of paying for bad distribution decisions mainly on gas industry companies and investors, not on consumers. He also asked for additional funding for fuel assistance programs, and more recognition of the dangers of insidious hypothermia.[196]

Independent citizen advocate Kenneth Springirth came prepared with a list of recommendations for the legislators. Springirth pointed out the big differences in regional pricing, depending on whether the utility used local gas supplies.[197] One demand drew such an outburst of applause from the audience that the chairman had to call the meeting back to order. Springirth argued, ". . . require utilities to purchase the most reasonably priced gas and if cheaper local production gas is available, the utility should be required to use it in place of the more expensive gas from other areas."[198] The message was clear: Erie needed more local gas.

4.3 First Initiatives: Municipal Drilling and Regulation

The poorest citizens of Erie were desperate to find ways to pay for heat, but the City of Erie was also desperate. At that time, the economy was truly terrible. In just one example, the home loan interest rate hit its all-time high in October 1981, at a usurious 18.45% for a thirty-year

---

[196] Federal Response, 4-12.

[197] Ibid., 6.

[198] Federal Response, 14.

fixed mortgage.[199] Deindustrialization, the energy crisis, inflation, and Reaganomics all contributed to the economic crisis. Erie, like so many rust belt cities, struggled to reinvent itself. While Erie residents were fighting state plans to drill for gas in Lake Erie (to protect the region's tourist industry centered on Presque Isle State Park as described in the previous chapter), many of the same citizens advocated expanded drilling on land. Ironically, an abandoned, oozing well in the Park—part of the legacy of decades of well-drilling—contributed to the surge of interest in drilling in the City of Erie. The Park well was first in a chain of events that culminated in new gas policy for Erie and for Pennsylvania.

In the early 1980s, Presque Isle was an environmental paradox. It was the busiest state park in Pennsylvania with four million visitors annually coming to hike, picnic, hunt, fish, and enjoy the beaches.[200] Yet, in 1982, Presque Isle was one of eight sites in western Pennsylvania on the federal Environmental Protection Agency's priority list of waste clean-up sites.[201] Among the park's environmental problems were old gas wells. For at least ten years, visitors to one of the park's beaches had complained about the presence of a stinking black ooze, redolent of ammonia and the rotten-egg smell of sulfur. In 1979, Park personnel discovered the source—a leaking abandoned gas well hidden under a paved road. The city of Erie had drilled the 3,500-foot well in 1910. It supplied power for machinery at a city water treatment plant until the 1920s. The foul discharge was probably injected waste from the Hammermill Paper Co., located about four miles

---

[199]Federal Home Loan Mortgage Corporation: Freddie Mac, "30-Year Fixed-Rate Mortgages Since 1971," accessed November 14, 2017, http://www.freddiemac.com/pmms/pmms30.html.

[200] "Gas Well Plugged to End Foul Odors," *Pittsburgh Post-Gazette*, November 17, 1982.

[201] Ralph Haurwitz and Martin Smith, "Bruin Lagoon Cleanup May Begin in Spring," *The Pittsburgh Press*, December 21, 1982.

from the well.[202] However, Pennsylvania DER did not formally charge Hammermill with causing the leak, and the company denied it.[203] Park workers used a temporary cap to control the effluent and siphon it into drums until the International Petroleum Company installed a permanent cap in November 1982.[204]

Federal officials at the Environmental Protection Agency and the United States Geological Survey were concerned that the waste may have contaminated other abandoned wells, and through them the ground water too. The contamination could have spread over a wide area inside and outside the park.[205] However, local and state officials reported that it had no negative impact on the tourist industry or the local ecosystem. Bill Pennewill of the Pennsylvania Department of Environmental Resources and aquatic biologist Robert Wellington of the Erie County Health Department agreed that the effluent had not harmed the biota of the park or lake, and had not affected human health.[206] Pennewill then spoke about benefits to the park from the well. It was not completely plugged, which allowed the possibility that gas from it could heat some of the park's buildings.[207] The agency tasked with protecting the environment judged that the financial

---

[202] Hammermill Paper was one of Erie's oldest and most important manufacturers, see Michael J. McQuillen and William P. Garvey, *The Best Known Name in Paper: Hammermill, A History of the Company* (Erie: Hammermill Paper Company, 1985). However, McQuillen and Garvey do not address the pollution problems caused by Hammermill, or any paper mill for that matter.

[203] Ibid.

[204] "Gas Well Plugged to End Foul Odors," *Pittsburgh Post-Gazette*.

[205] Ralph Haurwitz and Martin Smith, "Bruin Lagoon Cleanup May Begin in Spring," *The Pittsburgh Press*, Dec 21, 1982.

[206] Ralph Haurwitz, "Presque Isle Park Gas Well Plugged," *The Pittsburgh Press*, November 16, 1982.

[207] Ibid.

advantages of a self-help gas well outweighed the potential for future problems, even in a place where environmental concerns would seem to be especially important.[208]

Pennewill may have been thinking of an existing gas well drilled by Monsanto Corporation, that supplied heat to Presque Ilse Park facilities.[209] The success of Monsanto's well inspired Erie Mayor Lou Tullio to raise federal and private funds for a survey of drilling possibilities in the whole county.[210] Monsanto, working with the U. S. Department of Energy (DOE), had done a preliminary study focused on drilling at the park and along the bay front. The city wanted DOE permission to hire Monsanto too.[211] Tullio first requested funding for the study from businesses located on the lakefront. Although he intended to seek federal funding, he did not want to wait for it. He hoped to move ahead with private money to generate energy savings for the city as soon as possible. Tullio expected to partner with business and industry; he hoped for gas on city property, but anticipated shared benefits from wells on private land.[212] As many as thirty public and private groups, including the city of Erie, Millcreek Township, a church, and a number of industries expressed interest.[213] All were major players in Erie's economy and life. Department of Energy officials, whose permission was necessary, met with Tullio and the concerned industry

---

[208] Ibid. In contrast to commercial wells that produce gas for sale, self-help gas wells supply their owners, like the water wells people drill in rural areas that have no municipal water system. Unlike petroleum, natural gas is useable just as it comes from the ground.

[209] Gary Wesman, "Can Shallow Wells Fuel Industry?," *Morning News*, January 16, 1981.

[210] Ibid.

[211] "Several Businesses Share in Gas Drilling Study," *Times*, January 4, 1980.

[212] "Tullio Asks Industries to Help in Gas Hunt," *Times,* December 12, 1979.

[213] "Industry, City, Schools to Investigate Drilling," *Morning News*, May 14, 1980. The industries included Erie Sand and Gravel Co., Erie Reduction, the GAF Materials Corp., Pennsylvania Electric Co., Koppers Co., and the Erie-Western Pennsylvania Port Authority. See "Several Businesses Share in Gas Drilling Study," *Times*, January 4, 1980.

representatives.[214] DOE agreed to fund the study when the local businesses agreed to split the cost.[215]

The joint study by the U.S. Department of Energy and Monsanto Corporation revealed that natural gas deposits underlay all of Erie County. Some citizens thought it was a waste of time to conduct a study when everyone already knew that gas was everywhere in Erie. Nevertheless, the federal government gave the city of Erie $65,000, and seventeen local businesses donated amounts from $400 to $500 each to fund the study. Although gas was found under the whole county, it was not necessarily available in commercially profitable amounts everywhere.[216] The study based its conclusions on the examination of surface geology, and aerial photographs taken by the USGS. It identified promising places to drill on private land as well as city property. However, the study could not guarantee that these sites would be productive. Only sinking a 'spud' (the initial stage of drilling) could determine that. Landowners were free to drill when they liked.[217]

The new study confirmed a number of previous studies and the experiences of drillers: shallow wells in the Devonian formation down to about 1,200 feet yielded small but fairly dependable amounts of gas. Deeper wells, into the Medina formation, could produce commercially important quantities.[218] For self-help wells, the situation was ideal. Gary Moody, of the gas exploration and drilling firm Moody & Associates, observed, "You can dig just about any place in Erie County and get gas." Moody's firm would go on to produce wells for homeowner

---

[214] "DOE to Study Erie Gas Wells," *Times*, January 23, 1980.

[215] "Bayfront Gas Well Topic of Meeting," February 20, 1980.

[216] Gary Wesman, "Gas Drilling Study – Wise or Waste?," *Morning News*, January 15, 1981.

[217] Gary Wesman, "Can Shallow Wells Fuel Industry?," *Morning News*, January 16, 1981.

[218] "There's Gas Down There, Consultant Claims," *Morning News*, May 16, 1980.

consumption, for the city of Erie, the Erie School district, and Millcreek Township.[219] Geologist Dr. John P. Gilewicz of Gannon University agreed that shallow wells in Erie were unlikely to produce great quantities of gas, but that they could persist for decades. Such wells had been part of the supply for local utility National Fuel Gas Company for a long time. "The gas in this area is good, but not spectacular." Gilewicz considered Erie gas unlikely to make any great contribution towards national energy needs.[220]

The industries that considered it worthwhile to contribute small sums to Monsanto's study of potential well sites claimed that they did not expect a payoff very soon. They were investing in information that would be useful if new technology developed that would make shallow Devonian shale wells productive on an industrial scale. Devonian wells were relatively inexpensive to drill ($30,000 to $40,000 in 1980) and might last 50 years, but they commonly produced only one to five thousand cubic feet of gas daily, about enough to heat a few houses. Deep wells would be much more productive, on the order of 25,000 to 100,000 cubic feet, but also much more expensive to drill ($125,000 in 1980).[221]

Even though industrial gas users claimed that information from the study would not be immediately useful, they apparently expected to have exclusive access to the information for at least several months. Erie city government and the contributing companies had paid for only about 10 percent of the study cost. However, Erie City Engineer Wasinder Mokha announced that the full report would not be released for two to six months, "to keep the moochers out." Contributing

---

[219] Wesman, "Gas Drilling Study – Wise or Waste?"

[220] Paul Groucutt, "Gas Wells Expensive, but Becoming Popular," *Times-News*, February 23, 1980.

[221] Wesman, "Can Shallow Wells Fuel Industry?"

company owners did not want other individuals or businesses to begin speculating on good sites. Mokha said, "They've paid for the study and have a right to an exclusive look at it." He admitted that the city was obligated to make the report public because public funds had also paid for it.[222] Really, private companies had contributed a relatively small fraction. Those contributors may have had reason to believe that the technology needed to make shallow wells worthwhile to industry was not very far off.

The Monsanto study prompted the first serious local effort to draft legal controls on drillers within the city limits. The study would clearly increase drilling, which raised concerns mainly about public safety. Mayor Tullio planned to propose an ordinance that would regulate gas drilling in the city, but only as a safety measure. He plainly stated that he did not want to discourage drilling.[223] Erie City Engineer Wasinder Mokha and the city council agreed with the mayor. Mokha said. "We're obviously going to need some kind of ordinance to regulate it. You just can't have any kind of gas well going up anyplace in the city." He added, "This could mean a good number of gas wells. It all has to be done carefully; you wouldn't want a gas well two feet from somebody's front door, for example. Valves have to be the right kind, and so on." At that time, there were no regulations at all to control drilling in the city. National Fuel Gas had requested such a measure two years previously, when a new private well in the city proved productive, but nothing came of the company's request.[224] Based on his research of drilling laws in other municipalities, Mokha proposed a permit requirement for gas and oil drillers.[225] Other main provisions of the city

---

[222] "Study Identifies Probable Sites for Natural Gas Wells," *Times-News*, August 15, 1981.

[223] "Tullio Proposes Gas Well at Treatment Plant," Morning News, December 5, 1980.

[224] "Safety Factor: Erie May Regulate Drilling of Natural Gas Wells," *Morning News*, February 22, 1980.

[225] "Erie City Engineer Gathering Data for Gas Drilling Law," *Times*, March 18, 1980.

ordinance concerned proximity of a well to the property line, and the requirement for a one-million-dollar liability policy.[226]

During a public hearing about the proposed measure, citizens objected most to the set-back provision (the distance required between the well and property lines) because it limited the opportunities for people who owned houses on small town lots. The council had already reduced the proposed setback requirement from twenty-five feet to twenty feet. However, one man called for fifteen feet in order to make it possible to give most people in town "the right to drill a gas well." "The average citizen cannot continue to be taken advantage of and that's exactly what happened. Don't tie our hands."[227] Another commenter argued against any placement restrictions at all. He claimed that the regulations were designed to keep ordinary citizens, the "little guy," dependent on National Fuel Gas for energy. A member of the city's energy committee added that natural gas was "put in the ground by the creator for the use of the people." Restricting access just allowed big business to continue "exploiting" and "profiteering" at the expense of others. "People are going to die this winter. We're getting into a period like the Great Depression. It's an energy depression." Only one citizen was concerned with the lack of energy conservation provisions in the ordinance. He wanted those with high heating bills to upgrade their homes to save energy.[228] Councilman Mario Bagnoni, who opposed the measure, "blasted" the zoning requirement because requiring any well to be at least twenty feet from the property line would make it difficult to drill on town-sized lots without a special variance. He accused Mayor Tullio of wanting to stop the

---

[226] George Miller, "Drilling Law Passes First Test," *Times*, November 18, 1981.

[227] George Miller, "City Council Asked to Alter Drilling Law," *Times*, December 3, 1981.

[228] "City Drilling Rules Fought by Residents," *Morning News*, December 3, 1981.

"little guy" from drilling his own well. The measure passed four to three. [229] In fact, businesses did file most of the first fifteen permit applications under the new law.[230]

The particulars of the protests against controls on gas extraction indicate that the issue was not so much about the practical realities of drilling. The right to drill was the important point. For the average homeowner with a town lot, a backyard gas well had little economic logic. The real grievance was about out-of-control utility expenses. Why would homeowners spend up to $30,000 (in 1980 dollars) to drill a well, when that amount of money would pay the heating bill for many years? Even the lower estimates for shallow drilling, starting at about $6,500, would be out of reach for those so poor that they were at risk of hypothermia. In addition, the residents who protested set-back provisions evidently did not consider the disruption they might experience from a well within a few feet of their own homes.

4.4 Drilling Fever

In the meantime, before any ordinance could be passed, municipal and community gas users began drilling at once. The excitement—and there was a lot of excitement—was first focused on the possibility of saving on rocketing energy costs during terrible economic conditions. Mayor Tullio moved forward with plans to drill on city land to benefit the Water and Sewer Authority, despite a lukewarm report on the site's potential. The Benedictine Convent and the Erie and Harbor Creek school districts planned deep wells into the Medina Sandstone, where high production was

---

[229] Paul Groucutt, "Gas Drilling Ordinance Passed by Council," *Morning News*, January 28, 1982.

[230] George Miller, "Drilling Law Passes First Test," *Times*, November 18, 1981.

most likely. Their successes exceeded their best hopes, especially in the case of Erie School District.

The Order of Benedictine Sisters in Erie gambled its "last red cent" on a gas well it hoped would supply the convent with energy for heat. It paid $100,000 for a 2,700 foot well, which luckily contained an estimated twenty-five-year supply of gas. The Sisters intended to start using the gas almost immediately and expected to save at least $500,000 over the life of the well. One member of the convent spoke further on the benefits of the well. "We think this discovery is a contribution to the movement of world peace," Sister Joan Chittister told reporters. "People are fighting over limited resources. If we have our own energy, we won't use up other people's resources."[231] The convent's decision to drill, reached by the religious community consensus, "caused headlines all over the world, probably because nuns were doing it" and was featured in a People Magazine article. The convent well lasted a long time, and still provides a small amount of gas.[232]

Erie's wastewater treatment plant was one of the first facilities the city hoped would benefit from its own gas supply.[233] The Erie Sewer Authority passed a resolution to approve drilling four wells at the waste water treatment plant. Mayor Tullio projected costs to drill between $400,000 and $500,000. Fuel bills at the time were $900,000 annually and rising fast. The Sewer Authority agreed to transfer mineral rights to the city if financing was arranged for drilling.[234] In late 1980,

---

[231] "Erie Convent Drills Well, Has Own Gas Supply," *Pittsburgh Press*, March 27, 1980. Sister Joan Chittister today is an internationally-known activist for "peace, human rights, woman's issues and church renewal." From her website, About Joan Chittister, Benetvision, 2015, accessed November 17, 2017, http://www.joanchittister.org/about-joan-chittister.

[232] Personal communication from Sr. Pat Lupo, January 16, 2017.

[233] "Erie City Engineer Gathering Data for Gas Drilling Law," *Times*, March 18, 1980.

[234] "Sewer Authority Approves Drilling of Four Gas Wells," *Times*, December 10, 1980.

Tullio sought city council's approval to drill near the city wastewater treatment plant. Tullio recommended drilling company Moody and Associates, who estimated drilling costs of $100,000 per well. Tullio proposed that the city borrow the money and repay it from savings on gas bills.[235] Tullio had hired Monsanto to research the most productive places to drill on the treatment facility site, because a small shift in location could greatly affect the output.[236] Unfortunately, the final study report from Monsanto did not identify any "high-probability sites" on the Sewer Authority property.[237]

Other municipal organizations began producing their own energy supply. Harbor Creek School District (in the lakefront township just to the north of Erie) drilled two productive wells, prompting a number of school boards and municipalities to consider investing in wells of their own. The cost was also $100,000 per well, but Erie's geology made success likely. Harbor Creek expected to recoup the expense in about two years, from savings in energy costs. Iroquois, Fairview and Millcreek school districts; Millcreek Township, as well as the City of Erie had all begun drilling plans by the early 1980s. Some of the school districts and municipalities planned joint projects. Erie City and the Erie School District, for example, were investigating that possibility.[238]

In March 1981, a well on the Erie Technical Memorial High School property confounded the predications about shallow gas well productivity, and local newspapers started using the word "bonanza." When only half-way to the well's intended depth, International Petroleum Service

---

[235] "Tullio Proposes Gas Well at Treatment Plant," *Morning News*, December 5, 1980.

[236] Wesman, "Gas Drilling Study – Wise or Waste?"

[237] "Study Identifies Probable Sites for Natural Gas Wells," *Times-News*, August 15, 1981.

[238] Paul Groucutt, "Gas Wells Expensive, but Becoming Popular," *Times-News*, February 23, 1980.

Company (IPSCO) drillers hit a completely unexpected high-pressure gas pocket. The well was intended to go down over 3,300 feet into Medina sandstone. Instead, at 1,850 feet, the drill bit evidently found a part of the gas-rich Oriskaney Sand formation, something that had never happened in that area. Pressure at the well-head was 3.5 million cubic feet, about four times what was expected of the planned deep well. "'We got a bonanza,' said jubilant School Director Edmond Giovanelli." School Director Edward Sparaga was a little more cautious—he observed that it was possible the well would run out in a few weeks, but the undiminished pressure after hours of continuous runoff was a good sign.[239] He added, "If the well proves out, we've got almost enough money left over to start another well somewhere else." [240] The gas pressure escaping the well was so great that an odorous cloud had spread over the whole city by evening. IPSCO called in specialists from Dow Chemical's Dowel Division to pump in a column of water to stop the gas. The Erie Fire Department and local supplier National Fuel Gas Company were swamped with calls from citizens worried about leaks and the possibility of explosion, although fire company officials said there was no danger.[241] The directors decided to cease drilling, run a gas line to the high school and use the gas until it ran out. Then they could think about drilling a deeper well. The high school had potentially one of the most productive wells of its type in northwestern Pennsylvania.[242]

In the midst of the drilling fever, one family in the city had a stroke of luck. James and Patricia Sonnenberg smelled leaking gas, which led to the discovery of an old orphan gas well just

---

[239] Gary Wesman, "Fumes Choke Erie After Drillers Hit 'Bonanza' at Tech Gas Well," *Morning News*, March 26, 1981.

[240] Wesman, "Fumes Choke Erie."

[241] Ibid.

[242] Dick Garcia, "Gas Well for School a 'Real Bonanza,'" *Erie Daily Times*, March 26, 1981.

three feet below ground level in the curbside grass strip in front of their house. In was on public property, but the gas was useless to the city because the well was not connected to any pipeline. The city decided to lease the well to the Sonnenbergs for one dollar per year. In exchange, the family would accept responsibility for putting the well into service for themselves. Then, when it was exhausted, the Sonnenbergs would cap it according to Department of Environmental Resources guidelines. The refurbishment would cost roughly a thousand dollars, and the family could reasonably expect the well to provide free gas for decades. The family saved the expense of a new well. The city saved the eventual cost of capping, for which it would have been responsible, because no one knew how old the well was, or who had drilled it. The Sonnenbergs were astonished to learn that similar forgotten wells were "numerous" in Erie. The newspaper reporter covering the story suggested that folks should get out their metal detectors.[243] There is no record of anybody else in Erie having luck like the Sonnenbergs, but other private citizens did drill wells for their own use. The city of Erie issued one hundred forty-eight drilling permits in 1983, and ninety in 1984, the last two years of local control over that process.[244]

4.5 Municipal and Commercial Interests

The unexpectedly high production of several early wells changed the focus of drilling within the city from self-help to commercial production. Organizations including the Erie Zoological Society and the Erie Airport Authority became more interested in selling gas from their

---

[243] Jack Grazier, "City Gives Couple Bonanza; A Producing Gas Well," *Times,* September 15, 1983.

[244] George Miller, "Law Gives Local Gas Well Regulatory Powers to DER," *Erie Daily Times*, March 13, 1985.

wells than using it themselves. The sale of gas violated the new local ordinance which restricted commercial wells within city limits. Worse, the private investors who financed wells for those organizations were accused of betraying public trust and profiting from a public resource. The National Fuel Gas Company also attempted to sink a commercial well into the newly-discovered high pressure pocket under the city. All of these organizations saw themselves as vying for the same limited gas supply, and no one knew how long the bonanza was likely to last.

The Erie Zoological Society began to sell gas from a well that was originally intended to supply the zoo itself, which was a violation of its drilling permit. The directors of the zoo arranged to have a gas well drilled on land owned by the City of Erie, for which the city would receive an eight percent royalty. Some of the investors that financed it were also members of the zoo board.[245] Twenty-one investors financed the well, $5000 from each. Under the details of their agreement, they stood to gain much less than the zoo or the city itself. The chair of the zoo board said that the investors were looking for a tax break, and just hoped that they would recover their money, and perhaps receive a small return. The circumstances suggest that the zoo solicited investments from charitable donors already inclined to support the zoo. However, the well far exceeded expectations, producing much more than the zoo could use for itself. The directors decided to sell the gas—all of it—to the National Fuel Gas (NFG), which violated the city's gas ordinance. The director fully expected to reach an agreement with the city to solve the problem. He emphasized that the gas income would enable the zoo to make necessary upgrades and repairs running into the hundreds of thousands of dollars without needing to request money from the city, a substantial benefit to taxpayers. [246]

---

[245] Paul Corbran, "Zoo Gas Well Turning into Hornets' Nest," *Times*, August 3, 1984.

[246] Jerry Trambley, "Zoo Director Defends Sale of Gas," Times-News, August 5, 1984.

The zoo's decision violated several provisions of the city ordinance. Because NFG purchased all the gas, with none going to zoo buildings, the well did not conform to the zoo's drilling permit. The well location was zoned residential; to sell the gas legally the property would need to be rezoned light industrial. The city could opt to amend the ordinance to allow commercial drilling in residential areas, or to grant a variance to the zoo, based on its "hardship situation." Mayor Tullio favored that last solution.[247]

Complaints, mainly from the school board, hampered the mayor's inclination to allow the zoo a variance. The zoo's well appeared to tap the same gas pocket as the school's well in a formation that geologists expected to be productive for only a couple of years. Essentially, the school felt robbed of 'its' gas. However, legally, gas belongs to whomever recovers it—the school may have felt it had a prior claim, but it did not.[248] Further, the head of the school district complained that NFG had declined to purchase gas from the school well because it was not up to NFG standards. Now it was buying gas from the same pocket. An NFG spokesman replied that the zoo was willing to sell its gas according to company guidelines, but the school district was not. The zoo had purchased a filter that removed sulfur and made the gas marketable; the school could have done the same if it chose. In addition, the zoo's production went exclusively to NFG. The school district wanted to sell surplus gas when it had some, not by regular schedules or amounts.[249]

---

[247] "Tullio Gives 3 Options to Zoo," *Morning News*, August 7, 1984.

[248] Under the rule of capture, which has a long precedent in British common law and applies to fungible resources such as water, oil, and gas, "the owner of a tract of land acquires title to the oil and gas which he produces from wells drilled thereon, though it may be proved that part of such oil and gas migrated from adjoining lands." Agricultural Law Resource and Reference Center, "The Rule of Capture in Pennsylvania Oil and Gas Law" (Penn State Dickinson School of Law, 2010), accessed November 18, 2018, https://pennstatelaw.psu.edu/_file/aglaw/Rule_of_Capture_in_Pennsylvania_Oil_and_Gas_Law.pdf.

[249] Jerry Trambley, "Zoo Director Defends Sale of Gas," *Times-News*, August 5, 1984.

Although the school board was highly indignant about the idea of commercial sales draining the gas pool quickly, it had clearly approached NFG about selling to them.

The mood at a public meeting between zoo officials and the city council was highly charged. A councilman angrily demanded to know why the zoo had applied for a permit to extract gas for its own use, and then without informing the city decided to sell gas for profit. Zoo Society Chair John Quinn explained that the zoo could have saved about $35,000 in utility costs by using the gas, but it stood to gain possibly hundreds of thousands of dollars by selling the gas. The zoo board considered it a good business decision to have that source of revenue for capital improvements and operating expenses, which need not come from the city or other donors. Further, the driller was working at cost as a favor to the zoo and deserved a quick answer about whether he should keep drilling deeper. Tullio tried unsuccessfully to calm the more vocal opponents of the zoo, but all members of the council were critical of the zoo's actions.[250]

The councilmembers were angry at the idea that private investors, especially in the case of zoo directors, would make a profit from resources under public land. Zoo officials protested that the investors had risked the chance of losing their money in a dry well. Quinn, one of the investors, in apparent defense of the insinuation that zoo society members worked secretly to cash in on a good thing, said he had offered the chance to invest to city council members. However, at least one member denied he had been given the opportunity. Council President Joyce Savocchio pointed out, correctly, that a decision about the zoo well would set a precedent for wells on other city property. As zoo society attorney James Blackwell remarked, "This well established this city is sitting on a pile of gas."[251]

---

[250] Bill McKinney, "Zoo Officers Face Angry Erie Officials," *Morning News*, August 17, 1984.

[251] George Miller, "Zoo Gas Well Shut Off Until Dispute Settled," *Times*, August 17, 1984.

In view of the successful school and zoo wells, Mayor Tullio and city council members favored sinking commercial wells on other city properties, which they judged allowable because it would be in the city's best interests.[252] The school district continued to object to wells intended for sales to NFG. It pointed out that commercial extraction would hasten the depletion of the pocket much faster and repeated that under city zoning regulations, wells in areas zoned residential must be "an accessory to a structure," in other words piped into a building for its own use. However, NFG would only agree to purchase gas if it had exclusive access to the well—it would not buy "surplus" gas.[253] The school board argued that the people of Erie would be better served in the long run if commercial sales did not hasten the depletion of the gas pocket.[254]

After the meeting, and at Tullio's urging, zoo officials shut down the well until they could decide on a course of action.[255] In the face of accusations that they had violated the public trust, they made arrangements to reconnect the well to zoo buildings, while wondering what to do about planned repairs that gas income would have covered.[256] The city, still considering its own plans to drill, turned its attention to the substantial savings possible by converting its vehicles to natural gas.[257]

The Erie International Airport also benefited from a very productive private gas well drawing on the same Oriskany sandstone formation that supplied the school and zoo wells. The

---

[252] "Tullio Favors Drilling Gas Wells," *Morning News*, August 10, 1984.

[253] Paul Corbran, "School Board Seeks Meeting with Council over Zoo Gas Well," *Times*, August 13, 1984.

[254] Paul Corbran, "Business Manager Recommends Opposing Any Variance for Zoo Well," *Times*, August 7, 1984.

[255] "Zoo Gas Well Shut Off," *Times-News*, August 18, 1984.

[256] "Zoo Shuts Off Gas Well," *Morning News*, August 21, 1984.

[257] "Board, Council Meeting Over Well Drilling," *Times*, August 22, 1984.

Airport Authority leased drilling rights to a private company for an eight percent royalty and a supply of gas for airport facilities. Again, the Airport officials said that they had not anticipated the volume of gas, another "record buster." The drilling company was optimistic about the potential for more successful wells on airport property. Airport officials were expecting the city to request some of the gas revenue.[258]

The airport wells drilled by Vineyard Oil and Gas Company were so successful that some members of the Authority argued that the airport ought to get a "better deal." They wanted a higher percent of the revenue from Vineyard, or else a contract with a different drilling company. However, because no other company offered a higher percentage, the Airport Authority decided to honor and expand the contract with Vineyard.[259] Airport Authority President Louis J. Porreco urged other board members to act quickly to drill additional wells before prime locations went to those "pirating up at our borders."[260]

As in the case of the zoo controversy, municipal leaders were criticized for personal involvement in the airports' gas production. Porreco owned companies that had invested in 12,000 shares of Vineyard stock, which was only about three tenths of a percent of the company's shares. Nevertheless, because of Porreco's potential conflict of interest, he abstained from the vote in which the authority decided to reaffirm the original terms of the deal, and contract for four new wells.[261] Mayor Tullio was also suspected of hiding a personal interest. Political opponents

---

[258] George Miller, "Gas Well Could Be Bonanza for Erie Airport Authority," *Times-News*, March 3, 1985.

[259] George Miller, "Background: Interest in Airport Wells Goes Back to 1980," *Times-News*, July 17, 1985.

[260] Miller, "Background."

[261] Ibid.

claimed that Tullio failed to disclose that his wife was also an investor in the gas company that developed the airport wells.[262]

Once the possibility arose for variances that allowed commercial drilling in places not zoned industrial, National Fuel Gas applied for a permit to drill a commercial well in a location zoned C-2, or commercial. The company argued that a natural gas well was appropriate in a commercial district because it was analogous to a gasoline filling station.[263] NFG's attorney stressed the traditional rights of property owners. He opined, "In our society we are supposed to be free and the laws should protect us only when necessary."[264] The zoning board delayed acting on the permit for so long that NFG referred the matter to county court, which ruled in NFG's favor. City officials and school board officials planned to appeal the court decision, fearing again that commercial drilling would drain the gas pocket that supplied the school. Time was running out for NFG, as the rules for drilling continued to evolve. Pending local legislation would require a three-acre space to drill a commercial well in the city. In addition, under new state legislation effective on April 18, 1985, the state of Pennsylvania, not local authorities, would issue drilling permits.[265]

NFG began drilling in early April without a city permit. Reports indicated that NFG had drilled only about ten feet, possibly to establish the project as an existing well not subject to new state regulations.[266] The well at the corner of 38th and Liberty Streets was the first drilled within

---

[262] "Tullio to Give Council Plan Allowing Limited Gas Drilling," *Times-News*, August 21, 1985.

[263] George Miller, "City Will Appeal Ruling," *Erie Daily Times*, April 4, 1985.

[264] John Guerriero, "NFG Wins Ruling to Drill Well in Erie," *Morning News*, April 4, 1985.

[265] Miller, "City Will Appeal Ruling."

[266] George Miller, "Gas Company Starts Drilling Without Permit; City Vows Legal Action," *Erie Daily Times*, April 10, 1985.

city limits specifically for commercial production.[267] City leaders expressed outrage that NFG went ahead with their project without a permit and without giving the required advance notice of the drilling start date. The city expected to cite NFG for the violations. NFG defended its actions by saying that it had state permits and assumed that the court ruling in its favor made a local permit unnecessary. NFG confirmed that it wanted to start the well before the new state regulation took effect, forcing it to redo the application process.[268]

An NFG spokesman remarked that the well issue had been politicized in Erie, referring to the discussions at a council meeting.[269] That was evidently true. Mayor Tullio reversed his position on drilling commercial wells within the city. He declared that any potential benefit to the city was not worth the risk of depleting the school district well. If that well failed, the blow to district finances would probably require a tax increase. Tullio still believed that the commercial drilling would not deplete the school well, but he did not want to be held responsible for the possibility.[270] The timing of action or inaction by the city zoning board and mayor, regarding their failure to act on NFG's permit request, prompted one editorial to accuse the mayor of actually wanting NFG to drill its well, but not wanting to take responsibility for allowing it.[271] That conclusion is consistent with Tullio's long-standing ambivalence about drilling. The mayor's stance is in itself consistent: He judged whether or not to support gas extraction based on the relative benefits and risks to the

---

[267] Miller, "Gas Company Starts Drilling Without Permit."

[268] Gary Wesman, "Erie Goes to Court to Halt Gas Well Drilling," *Morning News*, April 11, 1985.

[269] George Miller, "NFG Stops Drilling," *Erie Daily Times*, April 11, 1985.

[270] George Miller, "Tullio Withdraws Proposal Permitting Commercial Gas Wells Within City," *Erie Daily Times*, February 3, 1985.

[271] Tony Zona, "City Zoning Law Gets the Old One-Two Punch," *Erie Daily Times*, April 4, 1985.

city. But it was also possible that he hoped to benefit personally, not just acquire political capital, from looser drilling restrictions. His wife's investment in the Airport Authority's venture was an ongoing scandal.[272]

4.6 Local Impact

The reality of living near gas wells became more evident after a number of organizations began to sink wells, which showed how little most citizens understood the implications of in-town drilling. City Councilman Bagnoni proposed an amendment to the city ordinance that would prohibit night-time drilling, presumably following complaints from people who lived near Mercyhurst College, where drilling was in progress around the clock. Bagnoni said, "All that noise and pounding travels quite a distance. I think they should only drill to eight or nine at night and then stop, so the neighbors can get some sleep without all that pounding going on." The college protested that they had communicated the drilling schedule to nearby residents, who hadn't seriously objected. Others pointed out that it is not really possible, practical, or safe to halt drilling, cap the well, then uncap and recommence. A nighttime restriction could halt any drilling in town.[273] This outcome would be at odds with Bagnoni's previous position on citizen's opportunities to benefit from their own wells, unless perhaps he thought of the college as a 'big guy.' Bagnoni withdrew his proposal, after city engineer Wasinder Mokha explained that trying to halt a well in progress would lead to increased danger of leaking gas, explosion and fire. It would

---

[272] Personal communication from Gary Wesman, January 16, 2017.

[273] Jack Grazier, "Regulation Hits Snag," *Times*, September 16, 1983.

also increase the cost and duration of drilling significantly. Bagnoni admitted that neighbors only objected to drilling that goes on for weeks. "They (the neighbors) didn't mind if it was a ten-day thing."[274]

As time went on, the dangers and nuisances of in-town drilling became more obvious. A news report characterized a well owned by the high school as "problem-plagued." An explosion injured a workman and prompted the evacuation of two school buildings. The workman was welding a section of pipeline when a different short portion of pipe blew out and broke his arm. The smell of gas filled the neighborhood, but not in dangerous concentrations. School officials planned to call in a consultant to evaluate the unexplained pipe failure, and advise on the construction of a bypass pipeline that would put the gas well back in production within a few days.[275]

Erie newspaper columnist Len Kholos stated his objection to drilling within the city. Kholos admitted that as an Erie taxpayer, he was grateful for the tax savings made possible by the school well. Nevertheless, he wished that NFG would suck all the gas out of the ground under south Erie as soon as possible, because he did not like living downwind of the school well. The bad gas smell was pervasive. He welcomed new state law, which would put restrictions on drilling in urban areas, but knew that the new law would not actually protect him from the nuisance of the NFG well. It was too far away for him to legally protest, but "well within gagging distance."[276]

---

[274] "Drilling Halt Unwise," *Times*, September 30, 1983.

[275] "Reasons Sought for Gas Well Explosion," *Times*, May 1, 1984.

[276] Len Kholos, "Erie's Atop Gas Pocket; Let's Leave It That Way," *Times-News*, April 17, 1985.

4.7 The 1984 Oil and Gas Act

The larger context for the conflict between the Erie city council and National Fuel Gas was imminent state legislation. Many people in Erie (besides those gagging on emissions from the high school's well) were concerned about the way drilling was handled locally and statewide. Regional concerns prompted discussion about the need for regulation at the state level. At a June 1981 public hearing, State Senator Anthony Andrezeski spoke to representatives of the Pennsylvania Department of Environmental Resources (DER), the Pennsylvania Fish Commission, the Erie County Health Department, and over 200 citizens, about the dangers of area drilling. Andrezeski explained that, out of the forty-one states with regulations for oil and gas drilling, Pennsylvania's laws were the weakest. Andrezeski said he was not anti-business, nor anti-drilling, but was concerned about long-term health problems and ecological damage. Citizens Advisory Council member Richard Kubiak reported that Pennsylvania did not require bonds to ensure that abandoned wells would be plugged, as thirty-eight other states did. Pennsylvania had no permit fee, no rule for well spacing, no requirement for well casing, and no mandate for reports on the chemicals injected into wells. Kubiak also accused DER of lax attention to reports of problems. Richard Zinn, regional director of Northwest Pennsylvania DER, said the agency had insufficient staff, and he planned to triple the number of agency investigators.[277]

Despite the level of acceptance people in Erie displayed for drilling in the built landscape, some long-term environmental activists began working to control the practice. Sister Pat Lupo OSB was one. Lupo was (and is) a member of the Benedictine Convent that decided by consensus

---

[277] Mary Benson, "Gas Drilling Rules Favored," *Times-News*, June 20, 1981.

to acquire a self-help gas well in 1980. However, shortly afterward she became a founding member of the Erie County Environmental Coalition, formed around 1983 to protest the lack of Pennsylvania gas drilling regulations. Sister Lupo said, "Anybody could drill, which caused issues; there was water contamination in many places" and "people's water caught fire." Lupo was also a member of the Citizens Environmental Council, part of the Pennsylvania Department of Environmental Resources, which eventually became the state Department of Environmental Protection. Initially she found that the attitude in Harrisburg was that "Erie wasn't even part of the state." That started to change in the late 1980s under Gov. Casey, who appointed Sister Lupo to several environmental advisory boards.[278]

In 1984, the state enacted Pennsylvania Act 223, the Oil and Gas Act of 1984 to regulate gas drilling. The law took effect on April 19, 1985. The state law was more restrictive than Erie's local ordinance and preempted it. For example, the state mandated a two-hundred-foot setback from buildings and water wells, which overturned the (contested) twenty-foot city requirement. Under the new law the Pennsylvania Department of Natural Resources would issue drilling permits and handle complaints, not local authorities. The city only retained the authority to impose zoning regulations, for example allowing drilling only in places zoned industrial.[279] Act 223 was a game-changer for the natural gas industry. As another Erie County Environmental Coalition member, retired Mercyhurst Professor Dick Kubiak expressed, "Prior to Act 223, of twenty-something gas-producing states, Pennsylvania was at the bottom [in terms of regulation]. Act 223 put us

[278] Personal communication from Sr. Pat Lupo, January 16, 2017.

[279] George Miller, "Law Gives Local Gas Well Regulatory Powers to DER," *Erie Daily Times*, March 13, 1985.

somewhere in the middle, and it drove the gas boys crazy. They didn't know how good they had it. They were drilling wherever. They were drilling in wetlands."[280]

Nevertheless, neither the original local ordinance nor the new state legislation halted the controversy over drilling in the City of Erie. By the end of summer 1985, Mayor Tullio proposed to city council an amended ordinance to allow commercial drilling on city-owned property and non-residential parcels of at least three acres. Tullio wanted revenue for the city, and said the council would be responsible for a budget shortfall if they opposed the revised drilling regulations. The revised ordinance would allow the zoo to sell gas to NFG.[281] The zoo officials continued to advocate for the right to sell gas to fund significant repairs. Some members of the council remained opposed to commercial sale of gas. They advocated using wells to supply the city's own needs. They argued that it made no sense to sell gas to NFG, which would quickly deplete the underground pool, while paying NFG a higher price to supply the city or zoo with gas.[282]

Experts continued to contradict each other as competing interests defended their positions. Drilling consultant Mack Porter, who was also gas consultant for the school district, informed the council that commercial extraction of gas could deplete the Oriskany pocket before the city even had a chance to drill its own wells. He argued that the private investors would reap all the benefits and force higher taxes to fund the school system and the zoo when their wells went dry.[283] City Engineer Wasinder Mokha countered that the city ordinance restrictions, which stipulated the property to be drilled must be three acres and contain only one single-purpose building, would

---

[280] Personal communication from Dick Kubiak January 18, 2019.

[281] "Tullio to Give Council Plan Allowing Limited Gas Drilling," *Times-News*, August 21, 1985.

[282] "Tullio urges Council to Allow Zoo, City to Sell Gas," *Morning News*, September 10, 1985.

[283] "Consultant Warns City of Depleting Gas Supply," *Times-News*, September 9, 1985.

keep private investors from competing with the city. Only a few parcels existed that would qualify and the city owned them all.[284]

4.8 The "Frac" Experiment

Erie's quest for an increased gas supply and fear of exhausting the existing wells contributed to the development of hydraulic fracturing, the gas-extraction method that would make the twenty-first century Marcellus Shale boom possible. Due to Erie's distinctive geology and struggling economy, the region probably had the most self-use wells in the state, perhaps the nation. Erie had an abundance of underground gas that was low pressure or difficult to extract. The existence of so many low-flow wells in northwestern Pennsylvania prompted an "experiment" in a new technology. The drilling companies called it "fracing." Possibly for the first time, Erie residents learned that "fracing" was short for "hydraulic fracturing," a process that pumped a mixture of water, chemicals, and sand under high pressure into a well, to open up fractures in the surrounding shale, and release the natural gas.[285]

The Department of Energy (DOE) partnered with the independent Gas Research Institute and the Monsanto Corporation to do a "fracture study" of low-producing wells, and make the results available to local industry and government, who would cost-share the study, and arrange for leasing and drilling.[286] Gary Moody, head of a local gas and oil exploration firm, was initially

---

[284] Jack Grazier, "Ordinance Would Protect City of Erie in Selling Gas," *Erie Daily Times*, September 11, 1985.

[285] Liz Allen, "Hopes for School Gas Wells Pinned on Experiment," *Morning News*, August 20, 1985.

[286] "Safety Factor: Erie May Regulate Drilling of Natural Gas Wells," *Morning News*, February 22, 1980
.

highly critical of the study. He told a school board meeting that those wells would produce perhaps 2,000 to 8,000 cubic feet per day, which was only enough for a private home, not a big public institution. He warned the board not to "let glamour overcome reality." He accused Monsanto and the Institute of experimenting with the idea of shallow shale gas wells, because no one yet knew how to extract gas from shale.[287] However, within a year, Moody discussed the difficulty of getting gas out of the Devonian shale with a local reporter, and said that coming technology would make Devonian shale gas an important commercial source. Certainly DOE was optimistic enough about the possibilities to fund studies of shale gas and experimentation with new technologies.[288]

The Erie School District contracted for new three wells in 1984 to supply a district elementary school, a middle school, and an administrative building. Initially none of the wells produced much gas. That changed after the wells were "stimulated" by "fracing." The school district reported that it now expected the wells to supply between 70 and 100 percent of the energy needs for the three buildings. The school district had received a grant from the Pennsylvania Energy Development Authority to pay for the experimental and logistically-challenging drilling practice. The drillers involved worked at a discount in hope that success would lead to more business. They estimated that 2,000 such old non-productive wells existed within the city dating from much earlier than the 1980s boom—an interesting glimpse at the long history of self-help wells. The district was required to report the practice to the Department of Environmental Resources. A project spokesman mentioned that "We tried to get all the chemicals out of the well as quickly as possible." But he didn't say why.[289] Commenting on whether or not it was worthwhile

---

[287] "Driller Slams DOE Gas Well Proposals," *Times*, May 15, 1980.

[288] Wesman, "Gas Drilling Study – Wise or Waste?"

[289] Liz Allen, "Hopes for School Gas Wells Pinned on Experiment," *Morning News*, August 20, 1985.

to spend the federal grant money on researching new gas, City Engineer Wasinder Mokha said, "'The energy industry advertises that it is spending so many billions of dollars to explore new sources of energy. Taking risks, in other words. They say it with pride; can't we?'"[290]

4.9 Conclusion

The gas-drilling boom in Erie during the late 1970s and early 1980s had a substantial impact on the landscape of opportunity available to the gas industry during the twenty-first century Pennsylvania Marcellus Shale boom. Erie's poorly-regulated spate of municipal drilling contributed to legislation at the state level for at least some control. The 1984 Oil and Gas Act was the basic legal framework for almost thirty years, until the 2012 passage of Pennsylvania Act 13, the regulatory overhaul in response to Marcellus drilling. [291] The connections between energy costs and poverty in Erie, which drew national attention, only reinforced a perception among a portion of the population that gas extraction should be encouraged, not restricted. Conversely, Erie's gas boom also produced a cadre of those who protested the unregulated drilling free-for-all. Both groups, and some of the same people, were still around in 2007 for the Marcellus boom. In addition, Erie's abundance of shallow and low-flow wells stimulated experimentation with new technology to extract gas from tight shale, ultimately contributing to the development of the fracking procedure that is so central to the success of the Marcellus boom.

---

[290] Wesman, "Gas Drilling Study – Wise or Waste?"

[291] "The Oil and Gas Law of the Land: Act 13," StateImpact Pennsylvania, National Public Radio Member Stations, accessed November 17, 2017, https://stateimpact.npr.org/pennsylvania/tag/act-13/.

The extraction and regulation of natural gas is complicated by its fungible nature: As a resource it acts more like a school of fish than a vein of coal or an over-grazed meadow. Gas flows. The gas under Erie certainly was a commons until, by rule of capture, someone drilled a well to extract and claim it. Beset by economic pressures and federal actions, Erie's leaders and citizens did not unite to protect their common gas reserve, as they had united to protect their common interest in protecting Lake Erie. Instead, the community, fragmented by their conflicting interests, rushed to maximize individual benefits before the bonanza ran out.

This aspect of the 'tragedy of commons' is of course not limited to Erie, but Erie is an illustrative case study of the dynamic in a small-scale community. During the energy crisis of the late 1970s and early 1980s, people in Erie acted on an internalized principle of individual action to solve what was predominantly a collective problem, largely shaped by factors outside their control. The more power and agency that individuals possessed, the better they were able to negotiate rapidly shifting circumstances, which served to reinforce the neoliberal ideal of individual responsibility.

Although the gas boom of the 1970s-80s did not create the same kind of state-wide public controversy that the Marcellus boom has, a number of activists did press the case for environmental protection. Sister Lupo's work illustrates the long narrative arc of activism on energy issues in Pennsylvania. In reference to the decision to drill their well, Lupo said that the convent's main concern was of course energy prices, but the wars over energy resources did play a part. The Benedictines in Erie very actively support peace and justice movements, then and now. Sister Lupo:

> I want to say something else. I don't want you to think we are for gas. Right now we are fighting to keep fossil fuels in the ground. We are working for a moratorium on

drilling, pipelines and so on. Our organization is called Our Water, Our Air, Our Rights. Right now we are looking for funding for solar panels.[292]

Erie also provides a case study of the problems of federalism and divisions of jurisdiction. Municipal regulation may take note of resources and concerns unique to the region. The benefits and burdens of extractive industry look different at a small scale than they do at the national or even state level. However, the state overrides the local, and the federal regulation overrides the state. The federal government has power to set prices that determine whether or not an energy source is worth extracting. It can protect consumers from local self-interested powers. Nevertheless, policy for the national good may unfairly burden locals, as did federal gas price deregulation. The state of Pennsylvania, with less direct incentive to allow expanded drilling on land than it had in the lake bed, was able to enact some controls for the gas industry, despite a social climate that favored incentivizing extraction. This legislation was not adequate for the circumstances in the mid-2000s, when fracking—hydraulic fracturing combined with horizontal drilling—transformed the gas industry throughout the central Appalachians.

Fracking started small, its use stimulated by the desire to bring old wells back on line, as in Erie. By the time the potential in the Marcellus play became evident, there was a precedent for fracking—it was not necessarily an alarming new development. The experimental process of hydraulic fracturing was underwritten by government agencies and private industry, although changes in energy industries are fundamentally market-driven.[293] However, the dire need for abundant energy so evident in the region suggests a reason for industry and official interest, and for a measure of public acquiescence toward a new drilling practice.

---

[292] Personal communication from Sr. Pat Lupo, January 16, 2017.

[293] Tarr and Clay, "Pittsburgh as Energy Capital."

The ongoing struggles among interested parties in Erie's drilling controversy illustrate the process of negotiation and accretion by which frankly jerry-built energy policy evolves. Opposing political powers and market forces, counterbalancing against each other, created a regulatory structure with a shifting center, rather than a coherent and systematic plan. And the terms are always subject to debate and revision.

5.0 Drilling Rural Appalachia Part I: The Farmers

The legacy of extraction in Pennsylvania's Appalachian hinterland facilitated the modern gas boom. Many of the stakeholders in rural land use—farmers, drillers, conservationists, government leaders, and scholar-activists of the region—during the 1970s and 1980s were aware of the negative consequences of gas drilling. Some worked for passage of legislation to mitigate the worst impacts. However, on the whole, other considerations took precedence. The values and knowledge of rural landowners weighed in favor of gas drilling. Scholars of Appalachian exploitation and persistent poverty did not prioritize gas issues. Conservationists who sometimes did prioritize restrictive gas regulation focused on the threats to public parkland. No one advocated keeping the gas in the ground, as some do today. All these stakeholders were influenced by a blend of current and long-standing contexts. They were affected by the immediate economic and social issues of the decades which featured the rise of modern environmentalism and the nearly simultaneous energy crisis. Their actions and priorities were also fundamentally affected by fallout from the previous hundred years of drilling and other energy extraction.

Pennsylvania's mountains are a physical and cultural part of Appalachia, the rural region that encompasses the highlands that stretch from Maine to Georgia.[294] The mountains are a vast storehouse of fossil fuel energy: coal, oil and gas. Capital from outside the region financed modern

---

[294]Despite its exclusion from many studies of the region, (which tend to focus on a core composed of West Virginia, eastern Kentucky and Tennessee, western parts of Virginia and the Carolinas, and northern Georgia) Pennsylvania is a key part of Appalachia, in fact its cultural hearth. See John Alexander Williams, *Appalachia: A History* (Chapel Hill: University of North Carolina Press, 2002), 12-13. Geographer Wilbur Zelinsky, working during the period of my study, argued the same: ". . . cultural effects of the Midland and the Pennsylvania sub-region are legible far down the Appalachian zone . . ." Wilbur Zelinsky, *The Cultural Geography of the United States* (Englewood Cliffs, New Jersey: Prentice Hall, 1973), 127.

development, and most of the profits generated went outside too.[295] These are the hallmarks of a colonial economy. Conflicting land claims and patterns of settlement dating back to Revolutionary times forced many resident landowners to concede mineral rights to outside corporate interests as the nation industrialized in the nineteenth century.[296] If Appalachia is in some ways a sacrifice zone, an internal colony to supply energy to metropoles both inside and outside the region, that pattern originated in the Pennsylvania mountains. The booms and busts of extractive industries are a familiar pattern there. The gas boom that commenced with the federal deregulation of gas prices in the late 1970s expanded interest in drilling to new areas of the state, where some landowners still retained their subsurface mineral rights. These areas included the ridge and valley region that lies along the southern edge of the Allegheny plateau.[297] This chapter, the first part of a discussion of drilling for natural gas in Appalachian Pennsylvania, considers the role of rural landowners who did not see themselves as part of a colonial economy. Their decisions, which were a factor in keeping the state of Pennsylvania friendly to the gas industry, were influenced by a long-held system of land ethics and personal values, and also by the available knowledge of what gas drilling entailed.

Rural Pennsylvanian landowners in the 1970s and 1980s, whose actions and opinions set a precedent for the modern Marcellus gas boom, operated within the context of their era. They were impacted by the energy crisis, and concerned with preserving their land from environmental degradation and suburban sprawl. In addition, they had long memories and traditions that affected

---

[295] Williams, *Appalachia,* 229.

[296] Ibid., 76.

[297] Citizen's Advisory Council to the Pennsylvania Department of Environmental Resources, "An Evaluation of Environmental Impacts of Oil and Gas Production in Pennsylvania and Pennsylvania's Oil and Gas Regulatory Program"(September 1981): 7.

their decisions about gas extraction, in situations where they actually had a choice in the matter. The influence of tradition and the times, as well as their own interests, tended to encourage farmers to sell or lease drilling rights in the last quarter of the twentieth century.

Landowners' priorities and values alone do not adequately explain their land-use decisions. The availability of knowledge about the consequences of drilling was also an important factor. Rural residents during the 1970s and 1980s possessed much different common knowledge, compared to information readily available after about 2007. The amount of public attention paid to gas drilling, and the public presentation of gas's benefits and drawbacks, significantly affects what the individual citizen who has not made a personal study can know about it. Knowledge of environmental degradation caused by drilling, which could have dissuaded landowners (and particularly farmers) from signing leases with drilling companies, was publically available, but not widely discussed. Despite experiencing many of the same problems that drilling causes now, rural Pennsylvanians were more concerned with other threats.

Despite the environmental problems of drilling, farmers continued to allow gas drilling, which might suggest that they did not regard these problem as sufficiently important deterrents, or any concern of theirs. That conclusion is too simple. Rural people traditionally have valued land in practical terms of material production, and defended the right to use their land as they saw fit. But they were not indifferent to environmental degradation.

5.1 Land Ethics and Rural Values: The Culture of Conservative Liberalism

Farmers and rural landowners in Pennsylvania and adjacent parts of Appalachia who sold or leased natural gas drilling rights forty years ago were influenced in part by a set of agrarian

values, a long-held ethic of land use. These values—a combination of utilitarianism, libertarianism, and stewardship—encompass basic ambiguities between pragmatism and sense of place. Underlying all the theories about what motivates many farmers is their stubborn determination to hang on to their land and identity.

James T. Lemon, who studied the cultural roots that favor a utilitarian ethic of extraction, saw "the early signs of liberal North America in Pennsylvania as much as anywhere." In his 1972 classic, The Best Poor Man's Country: A Geographical Study of Early Southeastern Pennsylvania, Lemon argued that conditions of the initial settlement of Pennsylvania favored a "liberal, middle-class orientation" in its citizens. By that he meant that a combination of factors—cultural traditions, environmental, economic and social conditions, as well as the goals and expectations of those who chose to immigrate—favored an outlook in which "people planned more for themselves than for their communities." They placed "individual freedom and material gain over that of public interest." Lemon did not claim that early Pennsylvanians were "single-minded materialists," but that they did have a great sense of opportunity in an unlimited environment. Although Lemon wrote about the early settlement of the state, he was consciously writing about his own time as well. He wanted to provide insight and perhaps self-awareness to contemporary readers, who must learn to live with the knowledge that the world and its resources are finite.[298] In his analysis, Pennsylvania farmers developed a cultural tradition of utilitarian and libertarian rural values, which Lemon saw persisting into the latter half of the twentieth century, and which are still evident now.

---

[298] James T. Lemon, *The Best Poor Man's Country: A Geographical Study of Early Southeastern Pennsylvania* (Baltimore: The Johns Hopkins Press, 1972), xv-xvi.

For farmers, land-use issues are not simple. Utilitarian and libertarian rural values have a complicated relationship with environmental values, both in the abstract and on the ground. The defense of private property rights—itself an extension of liberal economics—can lead to environmental consciousness as well as environmental degradation. Often what looks like an anti-environmental attitude is actually distrust of high-handed regulation imposed from above. This distrust is long established, and possibly militates against activism for a high degree of government control over the right of a landowner to lease his gas drilling rights.

Conventional farmers who own the land they work can have assumptions in common with gas drilling companies about the proper use of land. At the same time, the differing natures of these two industries can create a conflict of interest. Farmers, like others involved in extractive industries, tend to be anti-regulatory and anti-environmentalist. They base their system of land use values—their land ethic—on utilitarian and libertarian philosophies.[299] This shared set of values may partly explain a long-standing lack of conflict with extractive industries over land use. Nevertheless, farmers and drillers have differing agendas. Farming must be sustainable to a greater degree than fossil-fuel extraction. Farmers often are invested in their identity as independent landowners and possess a strong sense of place. Even as they are willing to subsidize their businesses with income from mineral leases—part of a persistent and stubborn effort to remain on

---

[299] The formation of utilitarian social and political philosophy is fundamentally based on Jeremy Bentham's question: "What use is it?" Julia Driver, "The History of Utilitarianism," (*The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, 2009), http://plato.stanford.edu/archives/sum2009/entries/utilitarianism-history/. Libertarianism is a philosophy of self-determination based on the ownership of oneself and one's labor, and the right to ownership of property. Among its attractions are the moral defense it provides for freedom of action against outside interference. As expressed in American politics, libertarianism is used to defend right-leaning positions on the appropriation through development of natural resources held in common. It is not entirely a right-wing philosophy, however. It also serves to defend individual freedom of choice in such issues as sexuality, religious views and drug use. Peter Vallentyne, "Libertarianism" *(The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, 2009), http://plato.stanford.edu/archives/sum2009/entries/libertarianism-history/.

the land— they are aware of the possibilities for negative impact on the land. Although farmers who engage in conventional modern agriculture are often stereotyped as anti-environmentalist, they have sometimes made common cause with more conventional environmental activists against other extractive industries. One cannot conclude that farmers who allow drilling are completely indifferent to the possible negative effects of energy extraction.

Some writers on the ethics of land use have argued that the attachment rural people have to their own land and their intimate knowledge of it give them a strong sense of place. These factors instill a conservationist ethic and produce good stewards of the environment. Stuart Udall took this point of view when he discussed ethics and land use policy in the early days of the environmental movement. He believed that an agrarian connection produced a conservation land ethic. He argued that the nation needed a new land ethic because the majority of Americans no longer had a direct connection to the land.[300] Wendell Berry argued more specifically that the less industrially-inclined farmers preserved a respect for ethical limits in the use of land, especially in connection with energy. He used the example of the Amish community, whose members have deliberately exercised restraint in the use of technology. Berry characterized the methods of the Amish, which depend on human and animal energy more than on fossil fuels, as neither wasteful nor destructive.[301]

On the other hand, influential conservationist Aldo Leopold concluded that a human's working relationship with a particular place offers no automatic protection for the land. Leopold

---

[300] Stewart Udall, in *The Environmental Debate: A Documentary History*, s.v. DOCUMENT 101: Stewart L. Udall on the Land Ethic (1963), accessed February 28, 2013, http://www.credoreference.com.pitt.idm.oclc.org/entry/ghed/document_101_stewart_l_udall_on_the_land_ethic_1968.

[301] Wendell Berry, *The Unsettling of America: Culture and Agriculture* (San Francisco: Sierra Club Books,1996), 95.

was the first to use the expression 'land ethic' to describe the basis of values on which people decide the proper use of land. In Sand County Almanac he wrote for the need to establish a new working philosophy of land use to replace the competitive drive for economic gain. He called for an ethic that includes resources and the environment as part of the community to which humans feel respect and responsibility. Leopold saw the conservation movement as the beginnings of such an ethic, but he concluded that Americans' supposed "love for and obligation to the land of the free and home of the brave" did not prevent the loss of top soil, pollution of water, or extermination of species.[302]

Either despite or because of their working relationship with the land, a majority of farmers, and those rural residents who think like farmers, differ from conventional environmentalists in their view of the purpose and use of open land.[303] In the early history of America, farmers settled the wilderness and transformed what they perceived as wasteland into fruitful and civilized farms and communities. By the early decades of the twentieth century, a basic rift in land use philosophy had developed between farmers and those who had begun to value the wild for itself and to work

---

[302] Aldo Leopold, *Sand County Almanac* (New York: Random House, 1966), 239-240.

[303] For the purposes of this paper, a distinction between mainstream commercial farmers and landowning rural residents is not necessary if those residents largely share the values, knowledge and goals of their neighbors who are actually shipping milk, beef or corn. In any case, the definition of a farm, or a farmer, is a contested matter. Farming operations are heterogeneous, in both size and business models. Most farmers who depend on agriculture for a significant portion of their income, and who therefore judge themselves as 'real' farmers, use at least some of the new technologies developed during the agricultural revolution of the twentieth century: mechanized planting and harvesting equipment, hybridized seeds, commercial fertilizers, herbicides, and pesticides. The United States census, however, classes a farm as a place that sells more than one thousand dollars in agricultural goods in a year. So the line between a farmer and a rural resident is blurry. Today, fewer than one in four farms (as defined by the United States Department of Agriculture) gross as much as fifty thousand dollars in annual sales, let alone net a living wage for the farmer. The majority of Americans who self-identify for the national census as farmers have other sources of financial support—they (or a spouse) may have another occupation, or be retired and still live on a farm. These rural landowners share the farmers' anti-environmental reputation, which is not entirely unfounded. Statistics from the United States Environmental Protection Agency, "Demographics," *Ag101,* accessed March 1, 2014, http://www.epa.gov/oecaagct/ag101/demographics.html.

for its preservation. Wilderness enthusiasts tended to be urbanites who used undeveloped areas for recreational purposes.[304] Farmers clashed with outdoor enthusiasts and environmental preservation advocates over such issues as wildlife management including predator control and hunting rights, over proposals for wetland and scenic river preservation, and over disrespect for private property rights by off-roaders, campers and hikers.[305]

In the decades after World War II, conflict increased between farmers and environmental advocates over mainstream farming practices that caused soil erosion and water pollution, and especially over the use of herbicides and pesticides. Agricultural organizations reacted aggressively to criticisms of modern farm management, and they opposed federal environmental policy by leveraging their considerable power at the state and local level.[306] The voting record on environmental bills reflected rural resistance to such regulation; in nearly every case, the more rural an area, the stronger the opposition to environmental programs.[307] This anti-regulatory voting record of representatives from rural areas on farm-related environmental issues helps demonstrate the shared values of farmers and other rural residents. Given the dramatically decreasing number of commercial farmers, they would have been less able to consistently influence their representatives without the support their non-farming neighbors.

In the early 1970s, the Pennsylvania Land Use Policy Project investigated the land use values of Pennsylvania's rural residents. The authors of the report conducted a survey in order to assess public views on land use concerns and priorities. The results support the conclusion that

---

[304] Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955-1985* (New York: Cambridge University Press, 1987), 288.

[305]Hays, *Beauty, Health and Permanence,* 289-290.

[306]Ibid., 293-296.

[307]Ibid., 296.

rural residents' values are utilitarian and libertarian, although the respondents still expressed a desire to protect the land from harmful use. Respondents from the Appalachian region expressed a strong belief in the sanctity of private property and individual choice. They were anxious for new industry and jobs, but resented land degradation from past abuses. Farmers wanted government help to protect them from development pressure and rising operating costs, but they also reported that they "resent government intervention." They particularly protested against land acquisition by the government.[308]

Sometimes the purportedly anti-environmentalist attitudes among rural people are a function of bureaucratic arrogance. For example, the "anti-environmentalism" manifested by the population of the southern Appalachians, many of whom were evicted from their homesteads during the establishment of Great Smokey National Park, was a reaction to elitist federal planning that occurred without reference to the strong sense of place felt by those people forced to move.[309] Another example comes from a study of commercial farming operations in the Mississippi delta, which also concluded that resistance to conservation legislation was more anti-federal regulation than anti-environmentalist. Delta farmers took a utilitarian and economic approach to land-use planning, yet were still sensitive to the environmental consequences of farming. They commonly

---

[308] Pennsylvania Land Policy Project, *A Land Use Strategy for Pennsylvania: A Fair Chance for the "Faire Land" of William Penn* (Pittsburgh, PA: The Project, 1975), 129. This project, funded in part by a grant from the United States Department of the Interior under the provisions of the federal Land and Water Conservation Fund Act of 1965, produced a land-use proposal to the Pennsylvania Office of State Planning and Development. The study advisory committee, backed by the Western Pennsylvania Conservancy, included representatives from Penn State, University of Pittsburgh, county conservancy organizations, and environmental engineering and legal advisors. The project's goal was an integrated statewide plan to manage land and resources. It addressed cropland loss, suburban sprawl, extractive industries, wilderness protection, and flood control. Included is a detailed survey of Pennsylvania residents' attitudes toward land-use regulation.

[309] Michael Ann Williams, "'When I Can Read My Title Clear': Anti-Environmentalism and Sense of Place in the Great Smokey Mountains," ed. Benita Howell, *Culture, Environment, and Conservation in the Appalachian South* (Chicago: University of Illinois Press, 2002), 98.

implemented soil and water conservation management practices. However, they were highly reluctant to relinquish control of land-use decisions to outsiders.[310] In both these situations local residents who possessed unique understanding and attachment to a place reacted to their exclusion from the regulatory planning process. That reaction placed them in opposition to the goals of environmental advocates and earned them the name of anti-environmentalist.

Modern drilling companies themselves acknowledged the influence of rural values and resistance to federal intrusion in landowners' decisions to sign a drilling contract. Energy companies employ agents called landmen to negotiate with those from whom they want to lease mineral rights. Successful landmen use the known values of conservative rural residents to gain access to owners' homes and to deflect their concerns. These company representatives leverage patriotism, expressed as worries about America's energy needs and fears about foreign competition. They know about the resentments among conservative people toward big government interference. After checking on the political drift of owners' bumper stickers, landmen can defuse questions about environmental regulation by contrasting the role of local and state permitting with the intrusiveness of federal oversight.[311] Local control, the landmen imply, will be more sensitive to regional concerns—including financial benefits to rural areas—and not base regulation entirely on a national environmental agenda formed from an elitist urban perspective.[312]

---

[310] Eleanor Shoreman-Ouimet, "Concessions and Conservation: A Study of Environmentalism and Anti-environmentalism among Commodity Farmers." *Journal Of Ecological Anthropology* 14, no. 1 (January 2010): 52-66.

[311]These topics are included in a section of a landman's manual entitled "Talking Points for Selling Oil and Gas Lease Rights" appended to an article by Andrew Cass, "Landman's manual reveals natural gas industry secrets," *Voices of Central Pennsylvania*, May 20, 2011, accessed March 3, 2014, http://voicesweb.org/landman's-manual-reveals-natural-gas-industry-secrets.

[312] This discussion mainly examines the values and knowledge of a particular sort of rural landowner—most often someone who bases part of his income or his identity (I use the pronoun deliberately), on using land for agricultural production according to commonly accepted practices, and has the principal power to decide how the land should be used. But a more complete analysis may require a separate look at other types of rural residents. These might include

Nevertheless, farmers and neighboring landowners have at times effectively cooperated with more conventional environmentalists to oppose large-scale development projects that threatened the health and usefulness of the land. The most effective such partnership united in opposition to surface mining for coal.[313] During the 1960s and 1970s these rural Appalachian landowners acted as unconventional grass-roots environmental activists. The culturally conservative rural people who advocated for environmental protection laws against the powerful coal interests did so in defense of their own private property rights. Not only did they see that surface mining was a severe and irremediable encroachment on landowners' rights, they had learned by experience the link between environmental degradation and rural poverty. Under these circumstances, they made common cause with more mainstream labor and conservation organizations such as the United Mine Workers of America and the Allegheny County Sportsmen's League to push for tougher controls on surface mining.[314]

---

the urban incomers who had received a different sort of education, the farmers who used alternative agricultural methods because they held different values, and even the farmers' wives, who may have possessed less power and dissenting opinions. More nuanced conclusions may result from an investigation of how men and women approached environmental values and knowledge differently when faced with the prospect of drilling during the 1970s and 1980s. Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (New York: Harper Collins, 1980), and other ecofeminist scholars have produced a growing literature on the associations between gender and environmentalism. The results-minded authors of the previously cited landman's manual have also concluded that there is a distinctly gendered aspect to values and knowledge concerning land-use decisions. The best way to summarize their advice to their field representatives is this: Don't talk to women. Men, they say, don't like to admit that they don't know something, and are therefore less likely to ask awkward questions, for example about the details of the drilling process. Drilling companies have also observed that men tend to agree that the importance of national energy independence overrides other concerns. But, they report, women don't mind asking questions, especially about the effect of drilling on the environment. In different accounts of the Marcellus gas boom in Pennsylvania, women have played various roles. They have on occasion taken the lead in opposing drillers, but have also sometimes made the decision to drill. However, none of my sources on drilling before the Marcellus boom mentions female landowners or community leaders, with the notable exception of the Benedictine Sisters in Erie covered in the previous chapter.

[313] Hays, *Beauty, Health, and Permanence,* 291.

[314] Montrie, *To Save the Land and People.*

Other examples exist of environmental stewardship among rural Appalachian residents motivated by attachment to land and of local struggle against resource appropriation by outside interests. These include West Virginian ginseng hunters who worked during the late twentieth century to preserve the mountain hillside commons against coal and timber interests, and residents in several rural Virginia counties who participated in the 1993 environmental impact assessment of a proposed high voltage power line.[315] These examples show that despite farmers' utilitarian relationship with their land, and their acceptance of modern farming practices that have a negative environmental impact, farmers and other rural landowners do sometimes engage in environmental activism against other extractive industries. The relative lack of conflict and controversy between gas drilling companies and rural residents during the 1970s and 1980s cannot be fully explained by the assumption that rural land owners, engrossed by practical necessities, are indifferent to environmental concerns. Values alone do not dictate decisions—knowledge is another factor.

5.2 The Influence of Knowledge

Although the environmental impact associated with gas drilling did not receive the kind of public attention in the 1970s and 1980s that we see now, farmers in the first decades of the modern environmental movement had several readily available sources of information about gas drilling. They had knowledge about the positive and negative experiences of their neighbors during a

[315]Both these examples are found in Benita Howell's edited volume concerning Appalachian grass-root activism. The first is from Mary Hufford, "Reclaiming the Commons: Narratives of Progress, Preservation, and Ginseng," ed. Benita Howell, *Culture, Environment, and Conservation in the Appalachian South* (Chicago: University of Illinois Press, 2002): 100-120; The second is from Melinda Bollar Wagner, "Space and Place, Land and Legacy," ed. Benita Howell, *Culture, Environment, and Conservation in the Appalachian South* (Chicago: University of Illinois Press, 2002): 121-132.

century of oil and gas drilling. Farmers had access to reporting in the agricultural press. They, like other Americans, were influenced by the public discourse on environmental problems, especially the energy crisis of the 1970s. On the whole, agricultural knowledge facilitated acceptance of gas drilling.

One important basis of farmers' knowledge about resource extraction has been the very longstanding and common practice of selling and leasing mineral rights. Since the beginning of the gas industry in the nineteenth century, farmers have sold mineral rights on land they continued to farm because small scale farming frequently does not support itself. Agricultural operations in Pennsylvania quite often depended for economic sustainability on some sort of direct or indirect subsidy—unpaid or underpaid labor, government support, off-farm job income, externalized costs, and of course natural resource extraction such as gas drilling. The accumulation of successful experiences by the farmers who benefitted from natural gas income became an important part of the common knowledge base that other landowners drew upon to make their own decisions to lease drilling rights.

No one buys into Thomas Jefferson's views of the primary virtues and usefulness of the independent agrarian life more than the farmers themselves, especially beleaguered smaller scale agriculturalists in recent decades. In Pennsylvania, the immigrant's 'best poor man's country,' the farms have in many cases managed to conform to the Jeffersonian agrarian ideal—farm production began and has often remained both diversified in types of commodities grown and managed by small owner/operators.[316] Farmers may well resort to income from mineral rights with a sense of

[316] Pennsylvania Historical and Museum Commission, Agriculture History Project, "Historic Agricultural Resources of Pennsylvania, 1700-1960: A National Register Multiple Property Documentation Form, MPDF Introduction and Overview," accessed April 1, 2014, http://phmc.info/aghistory.

how precarious their profession and their land tenure has become. American farmers as a group are dwindling drastically, and those who are left—the strong, lucky, and stubborn—sometimes struggle to hang on to their farms in defiance of economic logic. The twentieth century agricultural revolution resulted in substantial reductions in numbers of farmers, farms, and acreage farmed.[317] Today only about 1 percent of the United States population identify themselves as farmers, although closer to 2 percent live on farms. Of that small number (by contrast more than 20 percent of Americans farmed in 1930), only a minority report farming as their major source of income.[318] Pennsylvania has followed national trends in the decline of farm populations that resulted from the industrialization, specialization, and commercialization of agriculture.[319] For example, in 1970, Pennsylvania had thirty thousand dairy farms. In 2004, only about nine thousand remained.[320] By

---

[317] For details on the extensive changes in American agriculture during the past century, including the case study of a York County, Pennsylvania, dairy farm, see Paul K. Conklin, *A Revolution Down on the Farm: The Transformation of American Agriculture Since 1929* (Lexington: University of Kentucky Press, 2008). Conklin also discusses the reasons that farmers struggle to keep financially unviable farms. Conklin uses the example of his father, who was forced by economic circumstances to take factory employment. Conklin said that afterwards his father's "main concern was status and self-identity. What my father always lamented was a loss of independence, of an entrepreneurial status. In his own words, he was no longer his own boss, able to control the timing and tempo of work. He continued to tend his beef cattle as a way to retain some sense of a past proprietary role and looked forward to retirement, when he could at least play at being a full-time farmer." Conklin, *Revolution Down on the Farm*, 91.

[318] *Ag101*, "Demographics," United States Environmental Protection Agency, accessed March 1, 2014, http://www.epa.gov/oecaagct/ag101/demographics.html.

[319] Pennsylvania Agricultural History Project, "MPDF Introduction," Pennsylvania Historical & Museum Commission (Commonwealth of Pennsylvania, 2014) accessed March 1, 2014, http://www.phmc.state.pa.us/bhp/AQL/context/MPDF_Introduction.pdf.

[320] United State Department of Agriculture, Economics, Statistics and Market Information System, Dairy Year Book, "Operations with milk cows, by state and region," accessed March 8, 2014, http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1207. Dairy is the largest source of farm income in Pennsylvania.

2013, that number had dropped to nearly seven thousand.[321] The preservation of the American family farm is a real problem.[322]

Although some farmers and other rural landowners have been deprived of their homes and businesses due to the environmental consequences of energy extraction by drilling and especially coal mining, others used the income from leased mineral rights to subsidize their farming operations. Examples of Pennsylvanians who supplemented their agricultural income with the sale or lease of mineral rights have existed from the early part of the twentieth century until the present. The following examples illustrate some of the wide variety of rural landowners who have used gas income to subsidize their farms.

Dr. Ira Garard's account of rural life in the late nineteenth and early twentieth century Greene County, described in the first chapter, specifically refers to the gas as a subsidy on subsistence farms. He wrote:

> Here and there over the county there was a well with commercial quantities of gas that was piped to the nearest village. The farmer collected a royalty on the gas and free gas to heat and light his house including an outside light, which was of the torch type and which could

---

[321] "Most Dairy Farms Exit Business Since 2007," *Hoard's Dairyman,* March 10, 2014, 151.

[322] As I write this, in the spring of 2018, Pennsylvania's dairy industry is in the midst of an historic economic crisis. The wholesale price of milk is below anyone's cost of production and dairy farmers are burning through their equity as they borrow to meet running expenses. Dairy cooperative processers are cancelling numerous farmers' contracts, which means those affected have no market for their milk. The number of dairy farms in Pennsylvania is down to about 6,650, according to the February 21, 2018 Milk Production report, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, United States Department of Agriculture, https://release.nass.usda.gov/reports/mkpr0218.pdf. The dairy industry, the backbone of Pennsylvanian agriculture, has lost 30 percent of its producers in the last decade. The dust has by no means settled yet. Our family will likely be among those who are forced to exit the business this year. The situation prompts the following question: If farmers benefit from gas leases, what explains the apparently inverse correlation between the gas energy boom and the bankrupt dairy farmers of Pennsylvania?

be seen for miles . . . Of course, only a few farmers received money from oil or gas, but what they did receive was generally more than they made from farming.[323]

Garard was evidently familiar with the details of drilling according to the technology of the time, yet he did not record any conflict between drilling companies and landowners. His account further suggests the shared utilitarian interest in natural resources between drillers and farmers. In fact, at times they seemed to have been the same people. The farmers assumed less financial risk than the drillers, who took the chance of sinking a dry well. Garard did not mention any other type of negative impact on businesses or properties that farmers risked by allowing mining or drilling. The work exhibits a detailed knowledge of the mineral extraction occurring in his county and the rest of southwestern Pennsylvania, as well as many other aspects of farming life there. As Garard did not gloss over the hardships of subsistence farming in the area, it is hard to imagine that he would have failed to mention problems related to drilling if he had known about any substantial examples. With this outcome, the landowner had no need to seek regulatory protection from drillers, and his neighbors did not need to worry about damage to their property. This sort of experience establishes a precedent. Note that Garrard published his account in 1980, at the time of the post-deregulation gas boom in Pennsylvania.

Accounts of the beginning of the Marcellus boom show how rural landowners perceptions of drilling drew on their knowledge of the previous generations' experience. In the early 2000s, journalist Tom Wilber interviewed the Carters, residents of Susquehanna County in Pennsylvania's Northern Tier. Wilber asked about their initial contact with a man representing Cabot Oil and Gas, a company interested in leasing their land for natural gas exploration. At that

---

[323] Ira D. Garard, "Greene County, Pennsylvania, 1890-1918," *The Western Pennsylvania Historical Magazine* 63, no. 2 (Apr., 1980): 146.

time, leasing for drilling in the Marcellus shale was just beginning and had not attracted significant public notice. Carter's father had been approached years before about leasing mineral rights on terms that his neighbors found acceptable: "Some property owners from previous generations had signed over mineral rights to land speculators for between one and five dollars per acre, with little ever coming of it but a modest check and a little paperwork."[324] The Carters saw little to suggest a problem in that experience.

Another example concerns Amish farmers who subsidized their operations with gas lease money. This example suggests that Wendell Berry is not entirely correct in his assessment that landowners who use preindustrial methods in their farming operations are not involved with fossil fuels. Erich Schwartzel of the Pittsburgh Post-Gazette reported on conservative Amish farm families in eastern Ohio that leased drilling rights. Although Schwartzel wrote, "Allowing gas drilling technology on their land is the latest example of religious tradition colliding head-on with the modern world," this connection between some of America's most traditional farmers and the natural gas industry is not new.[325] Schwartzel continued: "Many of the Amish farms of New Wilmington, Lawrence County, have shallow wells that have been on the property for decades. Recent drilling targets deeper gas formations like the Marcellus and Utica shales." The article included a photograph (Andrew Rush, Post-Gazette) of the superstructure of an older conventional well in front of the farmhouse. The decision to drill, therefore, had a precedent on this property. The experience with conventional drilling did not deter the family from allowing a new well. Another Amish group that used gas royalties to support their farming operation was the Mullet

---

[324] Wilber, *Under the Surface*, Kindle Locations 166-167.

[325] Erich Schwartzel, "Will Shale Boom Change Lifestyle of the Amish?" *Pittsburgh Post-Gazette*, Feb 3, 2013, http://www.post-gazette.com/stories/local/region/will-shale-boom-change-lifestyle-of-the-amish-673208/.

community of Bergholz, Ohio. It gained national notoriety because some radical members received prison sentences for a federal hate crime of beard-cutting other Amish men, whom they considered to have acted improperly. The Mullet gas money was used for legal fees and to sustain the families of the convicted men. In both cases, farmers had previous experience with drillers to guide their decision.

A different landowner, who had special reasons to avoid environmental damage to her property agreed to lease rights to gas companies, despite increased public knowledge of the potential problems associated with modern gas drilling. Denise Dennis, of Susquehanna County, Pennsylvania, had unusual incentives to preserve the historic appearance of her property. In 2012, she agreed to allow gas drilling below a farm that had been in her family for eight generations. Dennis intended to use the royalty money to repair and preserve features of the farm that had particular historical and archaeological significance. The original owner, Dennis's ancestor, was a free black Revolutionary War veteran. The farmhouse later became a stop on the underground railroad. Dennis decided that drilling would not harm the property, and the money would enable her to establish a visitors' center.[326] Dennis is an example of a landowner who is willing to accept the risk involved because of personal priorities and values: a deep desire to preserve family ownership and protect an important legacy.

In each of these cases, farmers and rural landowners successfully integrated gas drilling into their livelihoods. These decisions to allow drilling, stretched over a significant period of time, appear to have had neutral or beneficial effects on the life of the farm. Even if the financial benefits varied widely, none of these experiences as reported would discourage other landowners from

---

[326] John Hurdle, "Fracking Under Historic Farm," *New York Times*, 1 March 2012.

agreeing to drill. In addition to word of mouth among the farm community, the way experiences are publically reported adds to the widely held assumptions that are a factor in individual decisions.

The agricultural press is another significant source of information that farmers use to guide their decisions about many aspects of their businesses. Articles that mid-Atlantic farmers read in *Lancaster Farming* about natural gas during the 1970s and 1980s represented the mutual interests of the natural gas industry and agriculture.[327] They reinforced a sense of patriotic duty in the efforts of Americans to produce domestic energy and reduce reliance on imported oil. Spokesmen mentioned conservation in connection with natural gas, but only in the context of reducing the waste of gas, not in the sense of environmental protection from the effects of drilling. The news coverage fed the distrust with which farmers viewed government oversight, in articles that described the mismanaged federal policy that contributed to natural gas shortages.

In the context of the 1970s energy crisis, natural gas was a scarce commodity, likely to get even more scarce. In 1973, when the first oil and gasoline shortages were contributing to a national panic, natural gas was also in short supply in some parts of the United States. A crucial fuel, natural gas furnished about one-third of the energy used in the United States. Continued shortages of gas during the cold winters of 1977 and 1978, especially in the Northeast and upper Midwest, resulted in significant hardships for residential and industrial customers. People could not heat their homes. Factory closings and layoffs due to the shortages affected an estimated two million people.[328]

---

[327] The reference librarians for the Pennsylvania State University digital newspaper project characterize *Lancaster Farming* as the leading farm newspaper in the mid-Atlantic region. Published weekly since November 1955, it includes many items of interest to farmers, including breaking news and upcoming events, dairy, beef and other commodity market reports, business news, new product information, classified ads, auctions, 4-H and FFA news, and a food section. Amy L. Paster and Sue Kellerman, *Pennsylvania State University Libraries Digital Newspapers*, accessed March 20, 2014. http://digitalnewspapers.libraries.psu.edu/Default/Skins/lancasterfarming/Client.asp?skin=lancasterfarming.

[328] Graetz, *The End of Energy,* 98.

On February 19, 1977, the front page of *Lancaster Farming* featured a story about a "dismal" meeting in which spokesmen for a gas transmission company, the Pennsylvania Public Utilities Commission (PUC), and the governor's Energy Council discussed natural gas as "a real crisis situation" worse than during the 1973 oil embargo.[329] Although federal legislation had given agricultural users priority access to gas supplies, the PUC representative warned milk processors to plan for alternate fuel use or face the possibility of dumping milk. Furthermore, the representative did not guarantee "adequate" gas supplies for needs such as fertilizer.[330] In the face of declining production and growing consumption of gas, a Columbia Gas representative blamed the crisis on an apathetic national government and called for extreme mandatory conservation measures for gas, especially by switching from gas to coal for the generation of electricity. The representative warned that "the biggest difficulty [with the plan to switch to coal] will be the constant battle with 'would-be environmentalists,'" and that "environmental considerations cost a lot of time and money."[331]

Here, in the depth of February during a particularly rough winter, was a story that juxtaposed a crisis situation with the perceived sources of the crisis. The article first informed farmers about the possibility that the milk someone had gotten up in the freezing dark to produce would be poured down the drain for lack of energy to process it, and that when spring finally came there might not be enough already expensive and scarce fertilizer to make a decent next year's

---

[329] Sally Bair, "Energy Crisis Contemplated," *Lancaster Farming,* February 19, 1977.

[330] Natural gas is the principle feed-stock in the production of nitrogen fertilizer using the Haber-Bosch process, which was developed by German chemists in the early twentieth century. The availability of artificially-produced nitrogen is a key factor in the modern agricultural revolution, the basis of the exponential rise in world population over the last century.

[331] Bair, "Energy Crisis Contemplated."

crop. Then the article blamed mismanagement by government and obstruction from environmentalists for the situation. It is not hard to conclude whose side farmers would be on.

Other spokesmen for the agricultural community in the 1970s encouraged farmers to allow gas drilling, again stressing both public and private benefits. In the light of the reporting on the gas crisis and its potential effects on their businesses, farmers could hardly fail to see that a gas lease would not only provide direct income from gas sales, but would help to increase the supply of a vital resource. For example, an article published in autumn 1975 in *Lancaster Farming* presented the use of natural gas in an entirely positive light through two main points: an adequate supply of natural gas is necessary for the well-being of farmers, and the reason for the current shortage is a failed federal regulatory policy. In anticipation of a serious natural gas shortage in the mid-Atlantic for the winter of 1975, Bill Brier, the Director of Energy Resources for the National Council of Farmer Cooperatives (NCFC), explored the implications for the region's agriculturalists. Brier pointed out that the United States had sufficient domestic natural gas, a reference to new fears about the nation's dependence on foreign oil. He informed his readers that natural gas accounted for 15 percent of farm use as a direct energy source. But more importantly, he stressed its use in the production of anhydrous ammonia, a key source of nitrogen fertilizer, as well as in the production of other indispensable farm inputs such as herbicides, pesticides, and plastics. Brier, speaking for the NCFC, strongly recommended the elimination of federal price controls to allow the gas industry sufficient incentives to expand gas reserves and production. Brier's position was that the gas industry and the agricultural community had a mutual interest in gas exploration and development. Certainly the cooperatives that he represented, many of which sold LP gas, fertilizer, and sprays, had an economic interest in an adequate supply of gas. But the tone of the article

suggested to farmers that they would serve their individual best interests by supporting "maximum exploration and development of domestic natural gas supplies."[332]

Subsequent articles reinforced the message about the desirability of an increased gas supply. They reported additional warnings about the potential scarcity and high price of fertilizer and added that twenty-one farmer's organizations supported deregulation to stimulate supply. The articles generally portrayed expansion of the gas industry in a positive light, as they emphasized the vital need to provide the gas industry with financial incentives for exploration and development.[333] Congressman Tom Harkin (Democrat-Iowa), serving on the U.S. House Agricultural Committee and also the Science and Technology Committee, reportedly predicted higher prices and shorter supplies of gas. He urged farmers to look for alternatives sources of power.[334] More alarming was Harkin's failure to offer any advice on a possible substitute for fertilizer. In another article, a fertilizer company representative restated the connection between the cost of natural gas and fertilizer price and availability, and predicted long-term that natural gas would be in short supply by the year 2000. He stressed the critical need for fertilizer, especially in consideration of recent losses of farmland acreage, and argued that natural gas was too valuable as a chemical feedstock to burn for fuel.[335] In the context of the energy crisis, farmers competed with

---

[332] Bill Brier, "Regulations Blamed for Natural Gas Shortage: What Does This Mean for Agriculture," *Lancaster Farming,* October 4, 1975.

[333]"Gas Deregulation Asked For," *Lancaster Farming*, December 6, 1975; "Natural Gas Shortage Possible this Winter," *Lancaster Farming,* October 25, 1976; Dick Anglestein, "Adequate supplies but higher fertilizer prices for 1980," *Lancaster Farming,* March 1, 1980.

[334] "Congressman Warns Farmers Not to Depend on Natural Gas," *Lancaster Farming,* April 30, 1977.

[335] Dieter Krieg, "Farmers Given Glimpse of Fertilizer Future," *Lancaster Farming*, March 11, 1978.

other energy users for natural gas. These repeated messages undoubtedly contributed to a receptive mood among farmers when presented with the choice to allow drilling on their land.

Federal regulators further emphasized the close link between the needs of agriculture and the supply of natural gas. In response to gas shortages, the federal government adopted a multi-tiered priority system to allocate supplies.[336] The system privileged residential consumers over most industrial customers, but gave special priority to agricultural users. *Lancaster Farming* covered the proposed measures and the subsequent procedures that farmers should follow to receive their priority allotments, which would be priced at a lower rate than other industries paid.[337] The paper informed its readers of public hearings and Senate plans to prevent a negative impact on "essential agricultural use" as had happened during previous shortages. It published the deadlines to file necessary paperwork under the new allocation system. *Lancaster Farming* passed along a reminder to farmers from a county agricultural agent to register with suppliers and provide sworn statements about their past usage and future requirements, in order to receive the legislated protection against natural gas curtailments.[338]

Lancaster Farming warned its readers that despite these preferential measures, continuing bureaucratic problems between government bodies still threatened farmers' protection under the new regulations. Farmers read that the Senate Agricultural Committee had sent a sharp protest to the Federal Energy Regulatory Commission over a proposed plan of gas allocation curtailment measures that contravened the terms of the Natural Gas Policy Act, which provided for the priority

---

[336] Graetz, *End of Energy,* 104.

[337] "Agriculture to Get Top Priority Under Senate Compromise Gas Bill," *Lancaster Farming,* September 23, 1978; "Public Hearings Slated for Natural Gas Use" *Lancaster Farming*, December 2, 1978.

[338] "July 15 Last Day to File for Natural Gas," *Lancaster Farming,* July 14, 1979.

of agricultural use.[339] The information on natural gas that *Lancaster Farming* presented to a broad readership in the mid-Atlantic farming community during the energy crisis of 1970s reinforced the mutual interests of farmers and gas drillers to increase the natural gas supply and to keep a sharp eye on government regulation.

Then, as a new decade began, a shift occurred in the gas industry that affected the concerns of landowners. By the early 1980s, the energy crisis was a less pressing national concern. The deregulation of gas prices, combined with the increased demand for gas in the previous decade, sharply increased drilling in Pennsylvania.[340] That increase generated some evidence that landowners were experiencing conflicts with drilling companies and increased environmental problems. Lancaster Farming changed the tone of its message somewhat, as the paper began to cover stories on farmers' concerns about proper compensation for their mineral rights. Both rural landowners and representatives of drilling companies felt the need to form cooperative groups to share information and better protect their separate interests. Despite the shared assumption about legitimate land usage based on private property rights, there was some conflict between drilling companies and landowners, as well as a desire on both sides to protect legitimate interests and minimize avoidable risks. But still no fundamental disagreement arose over the desirability of drilling for gas, and no large public controversy existed over the possible environmental or social consequences of sinking gas wells on private land.

In response to the increased activity of the gas industry in seeking drilling leases in the early 1980s, agricultural groups such as county chapters of the Pennsylvania Farmers Association and the Agricultural Extension Service held public meetings to provide information on how

---

[339] "Senate Ag Committee Protests Proposed Gas Allocation," *Lancaster Farming,* February 24, 1979.

[340] Waples, *Natural Gas Industry*, 221.

farmers could best negotiate leases with drilling companies. The principal issue was to arrange fair compensation for their mineral rights, not how to regulate or prevent drilling. In September 1981, for example, the Wayne County Agricultural Extension Service and the county Farmers Association jointly sponsored an educational meeting for landowners. Joe Macialek, Community Development Agent for the Extension Service, stressed the importance of understanding the terms of the gas lease. In an interview with *Lancaster Farming*, which publicized the event, he said that drilling "may have a great impact on the land, the landowner and the community."[341] He explained important features of oil and gas leases, including details about the length of leases and the payments. He informed his listeners that although the gas exploration company offers the landowner a standard lease, the owner may negotiate for different terms.

In another example, in 1982 several Berks County farmers formed a union of landowners affiliated with the Pennsylvania Farmers Association to negotiate more effectively with oil and gas companies. They also wished to educate farmers about the implications of the terms in the leases offered to them. Each member agreed not to sign a lease until the company negotiated with the group as a whole. Chairman George Moyer emphasized that "the group is not against leasing land to the oil and gas companies; but for better terms." He outlined terms that farmers should negotiate for:

> . . . better monetary terms; reduction of lease terms from 10 years to 3 years or less; the right to inspect company monthly reports, well records and well meters; proper restoration of the land surface and payment for all damaged land; the right to determine the location

---

[341] "Agent Explains Oil and Gas Leases." *Lancaster Farming*, September 12, 1981.

of wells, pipelines, access roads and other structures; and the protection against the drainage of oil and gas by wells on neighboring properties.[342]

The inspection rights concerned the landowner's ability to verify the volume of gas extracted, on which royalty payments were based. The emphasis on surface restoration may have indicated past problems for farmers that resulted from drilling, but the problems were apparently not serious or extensive enough for individual cases to have made the farming news.

While farmers formed landowners' organizations in the 1980s, representatives of gas companies also met to seek legal and practical guidance in writing leases that protected their interests. In 1981, the Eastern Mineral Law Foundation's Special Institute, "The Oil and Gas Lease," met in Pittsburgh, for the first of a series of annual educational meetings. Its stated purpose was to form better communication between area landmen (company representatives that presented offers to land owners) and energy companies' legal advisors. The meeting was organized as a workshop to study specific clauses that should be included in a lease. These included gas storage, rights of way, delayed rental, royalties, pooling, warrantees, free gas, and implied covenants. [343] All these terms would likely be unfamiliar, at least initially, to the farmers confronting them.[344]

---

[342] Laurel Schaeffer, "Berks Forms Energy Group," *Lancaster Farming*, Jan 23, 1982.

[343] Eastern Mineral Law Foundation, Peter S. Wellington, President, *Special Institute: "The Oil and Gas Lease,"* November 4-5, 1981.

[344]Royalties are payments to the landowner, usually a percentage of the value of extracted gas. The use of a well for gas storage below ground can deprive the landowner of compensation if his payment is based solely on royalties. Rights of way may deprive landowners of control of property the drillers use to reach the drill pad. Delayed rental is a payment to the landowner that allows the gas company to extend the lease when drilling activities have not commenced during the time frame required by the terms of the lease. Pooling is the practice of acquiring a number of contiguous small parcels of land into a tract sufficient to comply with state permitting requirements. Schlumberger Oilfield Glossary, Accessed January 2, 2019. https://www.glossary.oilfield.slb.com. Implied covenants are the customary but unstated rights of the drilling company to make operational decisions according to legal precedent. These decisions may include when, where, and how many wells to drill; how the company will market the gas; or how it will protect the gas supply from extraction by a neighboring operation. "All these things are left to the discretion of the lessee, even though these aspects of the lessee's performance are critical to the value the lessor receives from the lease transaction. One early commentator stated, 'It is doubtful if any other character of

The workshop participants studied sample leases, forms required for filing leases, selected updates in mineral laws, and examples of legal cases. John Keller presented an essay on drafting the lease. He stated that the standard lease commonly offered was essentially the same one in use in the early twentieth century, even though conditions for the industry had changed substantially.[345] His concern underscored the importance of up-to-date knowledge to all stakeholders in the production of natural gas.

Often, conflicts between landowners and well drillers have their roots in the disconnection between the knowledge available at the time the lease is signed and the knowledge of the consequences in the aftermath of drilling. Gas drilling is not unique in this regard. For example, farmers in the early twentieth century signed broad form deeds that conveyed permission for surface access as part of the right to mine coal, but they did not anticipate that fifty years later their heirs would be fighting surface mining companies that actually stripped away the entire surface of the land. The technology had changed in ways landowners could not have been able to foresee. In a 1953 ruling by Pennsylvania's Supreme Court that defended landowners' rights, the judge acknowledged that no farmer in his right mind would have signed a mining lease if he knew that it gave the mining company permission to destroy his land.[346]

Conflicts over leases that are decades old persist, which reflect the changing expectations and knowledge of landowners. Recently, a Pennsylvania court ruled in favor of an energy company

---

legal instrument can be found in which one of the parties [the landowner] has so much potentially at stake with so little express contractual protection.' It is this characteristic of oil and gas leases that leads courts to impose implied covenants on lessees." Keith B. Hall, "The Application of Oil & Gas Lease Implied Covenants in Shale Plays: Old Meets New," 32 *Energy & Mineral Law Institute,* 8 (2011): 306.

[345] John K. Keller, Esq., "Drafting of the Modern Oil and Gas Lease," Eastern Mineral Law Foundation, Peter S. Wellington, president, *Special Institute: "The Oil and Gas Lease"* (November 4-5, 1981) 123-128.

[346] Montrie, *To Save the Land and People,* 67.

that possessed drilling rights to 160 acres in Jefferson County, Pennsylvania.[347] The original gas lease had been signed in the early twentieth century. At issue was a clause stipulating that the energy company relinquish rights to any acreage it deemed not worth exploring for gas. Although no drilling had occurred on the property since 1927, the current landowners lost their attempt to regain control of the 130 acres that had never been drilled because the gas company had not explicitly stated that the land did not warrant further exploration and development as required in the lease. The original lessors of the drilling rights probably did not anticipate allowing the gas company to retain the option to drill indefinitely. The problem over this lease would not even have arisen in 2014, after all parties had allowed more than eighty years to pass without further drilling, if the new fracking technology had not made gas drilling rights in Pennsylvania suddenly so valuable. The original landowners were apparently comfortable with an open-ended agreement based on the level of interest in natural gas and the practical possibilities available to extract it at the time they signed. The new owners of the land initiated the lawsuit based on knowledge of the current potential for extraction and income.

The timing and subjects for informational meetings imply previous legal issues that gas industry advisors hoped to help their clients avoid in future. But actual legal cases concerning conflict with landowners do not seem to have been a source of information readily available in the farming community. For one thing, then as now, legal disputes over gas drilling were most often settled out of court; the settlements contained non-disclosure clauses, and so did not enter the legal record or make the papers.[348] No general public knowledge of extensive legal conflict between

---

[347]Saranac Hale Spencer, "Energy Company Wins Gas Lease Dispute," *Pittsburgh Post-Gazette*, February 24, 2014.

[348] Personal communication from Joel A. Tarr, November 2013.

drillers and landowners apparently existed to act as a deterrent when farmers were presented with a lease designed by a drilling company.

5.3 Conclusion

Fundamental connections exist between values, knowledge and actions. Wendell Berry's The Way of Ignorance includes a conversation between a conservationist and a woman rancher. She had convinced her ranching family to alter its management practices so effectively that their commercially grazed range was in better ecological condition than an adjacent protected national wildlife refuge. When asked how one goes about changing a rancher's land ethic, she replied, "We didn't change our ethics. We're the same people we were fifteen years ago. What changed was our knowledge."[349] Farmers make their choices on how to use land based on what they value, but also on what they know.

This investigation of gas drilling in the 1970s and 1980s from the point of view of farmers is a case study of people who grounded their personal environmental policies in what they valued, but were nevertheless strongly influenced by what they were able to learn. It helps to explain the decisions they made more than thirty years ago about gas drilling, which affected the decisions made in the early 2000s. In the 1970s, during the national emergency caused by the energy crisis, farmers and gas drillers had a shared agenda. Generally speaking, they both had a stake in the expanded production of natural gas, and similar utilitarian views on the extractive use of resources.

---

[349] Courtney White, "The Working Wilderness: A Call for a Land Health Movement," *The Way of Ignorance*, Wendell Berry, ed. (Berkeley, CA: Counterpoint Press, 2005): 162.

In the 1980s, more conflict between drillers and landowners surfaced, but these revolved around lease negotiations for compensation and accountability given the prevailing context of markets and industry practices. Farmers' chief environmental concerns were restoration of the surface condition of fields and roads, rather than a concern for nature per se. The issues between drillers and farmers in the 1980s, if any arose, underscored their shared view of land and resources as private property from which the owner was entitled to profit. The general acceptance of gas drilling in the past fostered acceptance of drilling during the Marcellus boom.

This chapter only touches on what many assume is the biggest motivator for decisions: the money involved. Undeniably, the money matters. But, a full discussion of the economic implications of gas drilling must examine why, if money matters most, did resistance to drilling after 2005 become much higher at the same time that the potential payoff from gas drilling grew much higher too. And there may be indirect economic disincentives to lease drilling rights. Banks and insurance companies may be less willing to accommodate landowners whose properties are under lease. Drilling activity can reduce property value and marketability, and increase damage risks. Farmers rely on the availability of credit, and loans backed by property usually come with insurance requirements. Changes in the policies of lenders and insurers, and how those changes affected working farmers, are worth investigating for clues about the effects of gas drilling in the countryside.

That being said, farmers in Pennsylvania have placed more than an economic value on what they do and the land they hold, while still utilizing new technologies and constantly devising practical strategies in order to maintain their own economic sustainability. Indications are that the values that have affected their business decisions, especially the desire to preserve their independence and work-based identity, have remained largely consistent over the past several

generations. In the 1970s and 1980s, farmers' personal stake in their private property rights, their aversion to heavy-handed federal restrictions, and their concerns about energy shortages influenced their inclination to lease gas rights. Knowledge, especially the most easily available information, the stuff that is in the air at a particular time, is also among the biggest influences on individual decisions. When a farmer opens his door to a man in a cowboy hat who speaks with a drawl and wants to talk about a drilling lease, that farmer's response, as he thinks on his feet, will draw partly upon what he glanced at in the paper before chores, what the boys drinking coffee talked about while he paid for gas at the local convenience store, and what news played on the tractor radio while he did fieldwork.

6.0 Drilling Rural Appalachia Part II: The Scholars and Activists

Appalachia, as a distinct region of the United States, is characterized by its geography and culture, but also by its poverty. The region's economy attracted considerable attention in the 1960s through the 1970s. It was a centerpiece of the federal "war on poverty" that began during Lyndon Johnson's administration in the mid-1960s. Scholars and activists were among the stakeholders in Appalachia that had concerns about the well-being of Appalachia's citizens and environment. Sociologists, many with roots in the mountains, contributed to the emerging field of Appalachian studies. Some of these academics connected resource extraction with regional poverty, and actively worked to curb the industries that stripped the mountains of coal and timber.[350] They grappled with the colonial characteristics of the regional economy. However, the scholar-activists of Appalachian exploitation did not prioritize natural gas issues, because coal was so much more evident a problem. Mainstream conservation groups, more preoccupied with the environmental rather than the social consequences of extractive industry, also did not prioritize restrictive gas regulation. One important exception was the effort to protect the Allegheny National Forest (ANF) from effects of gas extraction, which reflected the prevailing environmental preservationist philosophy of the times. Environmentalists defended ANF public land in a similar way that concerned citizens defended their common interests in Lake Erie. Nevertheless, in most of Appalachian Pennsylvania, the urgency of other environmental issues judged more pressing eclipsed concerns about the impact of gas extraction. The preoccupations and limited focus of

[350] Williams, *Appalachia*, 309-398.

those working for environmental justice contributed to keeping Pennsylvania friendly to the natural gas industry, even after the passage of the Oil and Gas Act of 1984.

6.1 Colonialism and Energy in Appalachian Studies

An extensive scholarly literature of the mid-twentieth century exposed the environmentally and socially exploitive nature of Appalachian energy extraction. This literature argued that persistent poverty in Appalachia came from long-term systemic injustices, rather than characteristics of the mountains and their inhabitants. Poverty was not the result of mountain people's physical or character defects—the persistent and classist hillbilly stereotype. Nor did it stem entirely from the isolation and lack of infrastructure in the mountains. Rather, a direct connection existed between regional poverty and the high proportion of absentee ownership of Appalachian resources by the energy industry. In many regions, the residents did not actually own the surface, still less the subsurface mineral rights.

This scholarship, which coincided with national attention to Appalachian poverty, sought to disprove two explanations for Appalachian poverty—the "culture of deficiency" and "underdevelopment" models. The first attributed blame to personal traits of the stereotypically-imagined highlander, which were the alleged source of regional problems. In this view, the very nature of the shiftless, improvident, ignorant, fatalistic, slovenly, and probably inbred hillbilly accounted for the lack of regional prosperity. The second argued that isolation, and lack of investment, modernization, and infrastructure caused Appalachian poverty.[351] Academics and

[351]Helen Matthews Lewis, Linda Johnson and Donald Askins, *Colonialism in Modern America: The Appalachian Case* (Boone, North Carolina: The Appalachian Consortium Press, 1978), 14.

activists, such as those who formed the Appalachian Studies Association in the late 1970s, debunked both theories. They published work showing a more systemic source of persistent poverty: the power of absentee capitalists to control local economies, and the colonial nature of industry in the highlands.[352] However, concerning extractive industries, they focused mainly on timber and coal. Compared to the ravages of coal mining and clear-cutting, natural gas drilling evidently was not on the radar.

Helen Matthews Lewis was both activist and scholar, one of the founders of the field of Appalachian studies. Her research on the Appalachian coalfields led to the co-edited collection *Colonialism in Modern America: The Appalachian Case*.[353] She and her colleagues acknowledged limits to the colonial model, but they pointed out the similarity of Appalachia to external colonies, where wealth and resources flow out of an exploited country. The second section of the volume specifically concerned the extraction of resources. It dealt with coal most often, but the work also implicated the timber, cotton, and tourism industries in the region's impoverishment and loss of local political control. Ironically, considering its Appalachian geography and cultural roots, the study targeted Pittsburgh as one location of absentee big-city financial interests.[354] One essay, Rev. Jack Weller's "Appalachia: America's Mineral Colony," briefly mentioned natural gas and petroleum extraction as part of the problem, but nevertheless asserted that "coal is king."[355]

---

[352] Williams, *Appalachia*, 362-3. Williams presents a brief overview of influential Appalachian literature, fiction and non-fiction, by John Gaventa, David Corbin, Denise Giardina, Henry D. Shapiro, Rodger Cunningham, Ronald Eller, Wilma Dunaway, Deborah Vansau McCauley and Loyal Jones.

[353]Lewis, et. al., *Colonialism in Modern America: The Appalachian Case.*

[354]Ibid., 17.

[355] Ibid., 63.

Another contemporary study that attempted to diagnose the roots of Appalachian poverty also showed a preoccupation with coal among researchers examining the social and environmental effects of energy extraction. Charles C. Geisler and the Appalachian Land Ownership Task Force [ALOTF] produced *Who Owns Appalachia?: Land Ownership and Its Impact*, drawing on a database assembled by academics in cooperation with people who would now be described as citizen-scientists.[356] The research revealed the impact of extensive absentee and corporate landownership by large energy concerns. Such ownership eroded local tax bases; contributed to housing shortages, poor schools and bad roads; and discouraged diverse economic development. This landmark study also focused primarily on the coal industry, a narrow agenda acknowledged and afterward regretted by a key organizer of the project. Charles Winfrey, of the group Save Our Cumberland Mountains, explained, "We were an existing organization with an agenda . . . We were working on strip mining, coal issues, and tax issues . . . We were restricted because of our agenda at looking at coal."[357]

Nevertheless, the ALOTF project analysis included limited comments on oil and gas extraction. It reported the significant uptick in oil and gas leasing during the late 1970s, especially in agricultural areas not previously affected by energy extraction. The report treats natural gas as an adjunct to the business of drilling for oil, although the report mentioned "More [gas wells] would be drilled if more gas pipelines were constructed to transport the gas that is often found in concert with oil." In a telling comment, the analyst concluded that "Oil and gas extraction is not

---

[356] Charles C. Geisler and the Appalachian Land Ownership Task Force, *Who Owns Appalachia?: Land Ownership and Its Impact* (The University Press of Kentucky, 1983).

[357]Charles "Boomer" Winfrey, quoted in Shaunna L. Scott, "What Difference Did It Make?: The Appalachian Land Ownership Study after Twenty-Five Years," *Confronting Ecological Crisis in Appalachia and the South: University and Community Projects*, Stephanie McSpirit, Lynne Faltraco & Connor Bailey, eds. (University Press of Kentucky, 2012), 54-55.

normally regarded in Appalachia as being environmentally damaging, for few people have experienced it at first hand." Here, the conclusion is based on research done in what is usually viewed as the 'core' counties of Appalachia, which does not include Pennsylvania, even though the state had a long history of experience with the effects of oil and gas drilling. Instead, the report cites problems from such drilling in West Virginia, including poisoned livestock, ruined wells, degraded roads, and destruction of farm land and improvements.[358]

6.2 Pennsylvania Environmentalism and the Allegheny National Forest

In Pennsylvania, a number of other overriding land use concerns eclipsed the environmental problems of natural gas. As in the rest of the country, the growth of environmental consciousness influenced the state's citizens in the post-WWII era. In May 1971, with overwhelming approval from their constituencies, Pennsylvania's legislators passed Article 1, Section 27 of the state constitution, also referred to as the Pennsylvania Declaration of Environmental Rights Amendment, which read:

> The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.[359]

---

[358] Geisler, *Who Owns Appalachia*, 131-132.

[359] Thomas M. Schmidt and Helen S. Cordell, "Laws Which Regulate Land Use in Pennsylvania," *The Pennsylvania Land Policy Project* (Harrisburg: Pennsylvania Office of State Planning and Development, 1975), 23.

Policy makers in Pennsylvania were not focused on natural gas problems. They gave priority to other environmental and social concerns, as illustrated by a land-use planning document. During the early 1970s the Pennsylvania Land Policy Project prepared a report for the Pennsylvania Office of State Planning and Development to address the need for an integrated statewide plan to manage the Commonwealth's land and resources. The report was generated under the auspices of the Western Pennsylvania Conservancy (WPC), a Pittsburgh-based private conservation organization founded in the 1930s. In 1973, then Governor Milton Shapp initiated a project to generate a cohesive land-use plan for the state. WPC member Thomas M. Schmidt was the project coordinator. The finished report described current conditions, surveyed public opinion, and issued recommendations. Coal mining was the sole energy extraction issue included in the survey.[360] The report made few references to oil and gas drilling. It mentioned the establishment of Colonel Drake's first oil well in Titusville as a historic preservation site.[361] However, the report included an important comment about resource extraction in the Appalachians in its overview of the state's special land-use challenges:

> Mountains and the high northcentral plateau offer superb forests and parks, unspoiled landscapes, and abundant hunting and fishing opportunities. Yet these regions also must [emphasis added] supply coal, oil and gas, and raw materials for the second ranking industrial state in the Nation. The national energy crisis will increase these pressures.[362]

---

[360] Pennsylvania Land Policy Project. *A Land Use Strategy for Pennsylvania: A Fair Chance for the "Faire Land" of William Penn* (Pittsburgh, PA: The Project, 1975), 173. The energies of mid-century grassroots activists were overwhelmingly focused on the problems of coal, for example Montrie, *To Save the Land and People*.

[361] Pennsylvania Land Policy Project, *A Land Use Strategy for Pennsylvania,* 68.

[362] Ibid., 1.

Such a need reflected heightened public concern for the environment, awareness of a need to manage resources, alarm over the energy crisis, and anticipation of national land-use legislation.[363] Areas that Pennsylvania already regulated by the early 1970s reflected the top environmental issues. These included scenic rivers, surface mining, air pollution, coal mine subsidence, farm and forest land tax assessment, clean streams, coal refuse disposal, site development, open space acquisition, atomic energy and radiation control, soil conservation, and industrial development. The report highlighted the importance of Pennsylvania's natural gas reserves during the ongoing energy crisis, but it examined drilling primarily as it affected forested areas of public, not private lands:

> . . . the Commonwealth stores more natural gas than any other state, new recovery techniques and increased exploration doubled production activities in 1973, over a quarter million acres of State parks and forests are under lease for oil and gas exploration, production or storage. Lands of the Game Commission are similarly involved, and much of the Allegheny National Forest is checker-boarded with oil and gas developments.[364]

Although the report recommended portions of the Allegheny National Forest for wilderness designation, the threat to those lands that most concerned land planners was the construction of vacation homes, an extension of their concerns about development and suburban sprawl. A supplementary study of the economic consequences of state land planning on individuals, as weighed against the non-monetary benefits to the citizens at large, did not mention natural gas. Under the heading "Extractive Industries," there was a short discussion of coal mines and gravel

---

[363] Ibid., unpaginated preface.

[364] Ibid., 12.

quarries, but "Most other extractive industries will be little affected."[365] In short, the Pennsylvania Land Policy Project did not advocate regulation of natural gas extraction on private lands in the 1970s.

In keeping with the priorities that in many ways shaped the modern environmental movement, state environmental organizations prioritized wilderness preservation, the making of a separate space without human interaction.[366] The Western Pennsylvania Conservancy, the Pennsylvania chapter of the Sierra Club, and the state Citizens Advisory Council (CAC) approached the problem of gas extraction mainly (although not entirely) as a threat to wilderness preservation. They focused attention on the Allegheny National Forest (ANF). Conversely, the Forest Service, which was charged with stewardship of the ANF, was constrained by legal precedent that prioritized the rights of sub-surface mineral owners over the preservation of the surface environment. The passage of the 1984 Oil and Gas Act, fought for by the Sierra Club, CAC, and their allies in the legislature, introduced measures that would reduce the impact of drilling generally. However, it left the presumption of subordinate surface rights intact.

Although the Sierra Club in Pennsylvania was involved in the effort to regulate gas drilling, especially in the Allegheny National Forest, that issue was also not its first priority. When the state organization received its charter from the national Sierra Club in 1972, its initial focus was on environmental degradation from coal mining and pesticides. It was also active in issues concerning nuclear power, waste disposal and water quality.

---

[365] Benjamin H. Stevens, *Potential Economic and Fiscal Impacts of a Land Use Policy for the Commonwealth of Pennsylvania* (Harrisburg: Pennsylvania Office of State Planning and Development, 1975), 2, 4.

[366] In William Cronon's controversial essay "The Trouble with Wilderness; or, Getting Back to the Wrong Nature" he argues that 'wilderness' as we understand it is a cultural construction that excludes people from 'nature,' which makes modern efforts for a life of connection and harmony with the rest of the living world even more problematic. From William Cronon, ed. *Uncommon Ground: Rethinking the Human Place in Nature*. New York: W. W. Norton & Company, 1996.

Management of the Allegheny National Forest exemplifies the fundamental binary of American environmental thought: the conflict between conservation and preservation. The conflict helps explain why the Sierra Club was more apt to focus its attention on gas drilling in the ANF than elsewhere on privately-owned land. The idea of wilderness preservation was a reaction to the earlier Progressive era wise-use conservation model, as represented by Gifford Pinchot. Pinchot's guiding philosophy was utilitarian: the careful husbandry of natural resources, to provide the greatest good, for the greatest number, for the longest time. In contrast, wilderness advocate John Muir argued for the value of wilderness for its own sake, and for its importance to the human spirit. After 1945, Muir's ecologically-based preservationist view began to gain traction in policy debates.[367] The Sierra Club, founded by Muir and led by David Brower for many years, was arguably the strongest advocate organization for wilderness protection at that time. But the concept of wilderness precludes a working landscape, such as a privately-owned farm.

The Forest Service, the federal agency which managed ANF, had an institutional history that predisposed its administrators to prioritize extractive industry over other uses of the forest, such as recreation, wildlife, and watershed protection. Gifford Pinchot, the main architect and first chief of the National Forest Service at the turn of the twentieth century, rejected other uses (which did have their advocates) in favor of timber production and grazing. Pinchot's first priority was to ensure adequate timber supplies for the United States at time when rapid deforestation threated a future shortage.[368] He clearly expressed his views on the purpose of federal land set aside for

---

[367] Donald Worster, *Nature's Economy: A History of Ecological Ideas*, 2nd edition (Cambridge University Press, 1994).

[368] Samuel P. Hays, *The American People and the National Forests: The First Century of the U. S. Forest Service* (University of Pittsburgh Press, 2009), 7.

timber reserves, writing, "'National forests are not parks or game preserves.'" Historian and activist Samuel Hays argued that this "silviculture legacy" persisted and influenced the administrators of national forests to prioritize extractive industry, even after increased public pressure and legislative mandates for mixed use.[369]

At the end of the 1970s, federal gas price deregulation and the on-going energy crisis increased drilling impacts in Pennsylvania, revealing plenty of evidence of environmental degradation in the region that included the Allegheny National Forest. In 1984, the mayor and residents of Clarendon, Warren County, (in Pennsylvania's northern tier and now part of the ANF), reported that their water had recently gotten off-color with a petroleum smell. Similar problems had occurred at a local state park. A drilling company was operating nearby. [370] At that time the natural gas industry was treated as a subset of the petroleum industry. The Pennsylvania Department of Environmental Resources (DER), working with the owner of Clarendon's water company, traced the oil contamination to an old well very close to the township water source. The well's owner, a local man, immediately offered to plug it.[371]

Just to the north, in Chandlers Valley, citizens pressured the township supervisors to draft an ordinance similar to gas drilling regulations of other nearby communities, which demonstrated that communities felt the need to look out for themselves. Officials notified Chandlers Valley residents to stop drinking their water immediately because oil was found in it. The driller of the suspected pollution source, Black Stallion Oil Co., had obeyed existing laws, even casing its wells

---

[369] Hays, *The American People and the National Forests*, 52.

[370] Del Ristau, "Water Problems Strike Clarendon," *Warren Times-Observer*, January 24, 1984.

[371]"Old Oil Well Pollution Suspect," *Warren Times-Observer*, January 28, 1984.

although there was no legal requirement to do so then. The problem was that no one could supply a map of the water flow that supplied the village. The company declined to post a bond that would pay for contamination clean-up, because it was expensive and not legally required. It would, however, drill a new water well for the township if it had caused any contamination.[372]

In another small community of approximately seventy families just east of Warren Borough, the Department of Environmental Resources determined that methane pollution affected the wells of half the homes and the amount of pollution was increasing. Gas had collected in plumbing, basements, and walls. The water was odorous and off-color. The source of the contamination was twenty nearby gas wells owned by a lumber company, which had also illegally discharged gas into surface water in quantities sufficient to cause a public hazard. A Warren County judge and DER officials ordered the company, which had a history of non-compliance, to repair the defective wells, eliminate gas pressure at the well head, and drill no more wells for two months. The DER superintendent commented that the case demonstrated the need for oil and gas regulation such as the bill then before the House Conservation Committee.

The Pennsylvania Citizen's Advisory Council (CAC), an organization formed to help legislators make policy in line with the new constitutional commitment to environmental quality, responded to the reports of increasing impact from oil and gas drilling.[373] The CAC Committee on

---

[372] Del Ristau, "Chandlers Valley Residents Demanding Drilling Law," *Warren Times-Observer*, January 24, 1984.

[373] "It is the mission of the Citizens Advisory Council to strive to ensure that all people of the Commonwealth enjoy the benefits included in Article I, Section 27 of the Pennsylvania Constitution. This mission specifically states that the Council is to carry out the mandates of Act 275 of 1970 and Act 95 of 1992, by:

- performing non-partisan, independent oversight of the operations, management and policy of the Department of Environmental Protection;
- evaluating environmental issues and laws;
- participating in the development of environmental regulations; and
- providing advice concerning environmental matters to the Department, the Governor, the General Assembly, and the Commonwealth's federal representatives.

Resource Management corroborated the reports of serious water quality problems associated with oil and gas extraction in northwestern Pennsylvania. The CAC surveyed the industry throughout the state, but its most specific concern was the ANF, which contained over 100,000 oil and gas wells. In May 1980, members toured sections of ANF. What the Committee observed at active and abandoned drill sites prompted it to investigate threats from drilling and the effectiveness of existing legislation. CAC produced a thorough report of its findings, and made strong recommendations for improved regulation and better environmental protection.[374]

Vinnedge Lawrence, chairperson of the Citizen's Advisory Council, was also involved in the Sierra Club and served as the coordinator of the Pennsylvania Citizen Coalition for Responsible Oil and Gas Legislation. The Coalition included "environmental, conservation, and public interest groups, and individuals." Its members worked for regulatory control before the passage of the 1984 Oil and Gas Act. In April 1983, Sierra Club member Jeff Schmidt, on behalf of the Coalition, presented testimony before the Pennsylvania House Conservation Committee. He faulted both

---

The Council strives to represent all people of the Commonwealth and endeavors to bring a collective view of the public interest in environmental protection and natural resources, forged from the Council's own diversity of personal experiences and perspectives.
(Unanimously Adopted: November 20, 1989; Amended: November 12, 1996; Reaffirmed: March 15, 2005; Amended: April 17, 2007; Amended: February 23, 2016)
PENNSYLVANIA CONSTITUTION, ARTICLE I, SECTION 27:
The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all of the people, including generations yet to come. As trustees of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people." From the CAC website, accessed April 4, 2018, http://www.dep.pa.gov/publicparticipation/citizensadvisorycouncil/pages/default.aspx.

[374] Citizen's Advisory Council to the Pennsylvania Department of Environmental Resources, "An Evaluation of Environmental Impacts of Oil and Gas Production in Pennsylvania and Pennsylvania's Oil and Gas Regulatory Program." September 1981. Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016), Box 2, Folder 23. Archive Service Center, University of Pittsburgh.

sides: the gas industry for fighting against reasonable controls, and environmentalists for lack of effort to establish such legislation.[375]

The Coalition critiqued the proposed regulation, which it viewed as insufficient. CAC pushed for "rebuttable presumption" in which the burden of proof is on the driller to establish responsibility in the case of a contaminated water supply. CAC advocated for empowering Pennsylvania DER with the authority to shut down non-compliant wells by eliminating language that restricted DER to refusing future permits for problem drillers and limited DER's cease and desist power to five days. CAC recommended bonding fees of $10,000 for one well, or $100,000 for multiple coverage to pay for capping wells if necessary, and a $100 permit fee to cover administrative costs. CAC wanted to shorten the time required for restoration of a well site to six months. The CAC leadership urged fellow organization members to contact state representatives.[376]

At the federal level, Republican Pennsylvania legislators U.S. Senator John Heinz and U.S. Representative William Clinger backed a different bill to offer added protection to the Allegheny National Forest. The bill would reserve 9780 acres of ANF as a designated wilderness, and another 9200 acres as a national recreation area. These reserves amounted to less than 4 percent of the 500,000 acres in ANF. The bill was designed to protect parts of the forest from logging and drilling for oil and gas. Five hundred wells had been drilled in 1982, twice as many as any time in the

---

[375] PA Citizen Coalition for Responsible Oil and Gas Legislation Newsletter, April 28, 1983. Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016), Box 2, Folder 23, pp. 1-4, Archive Service Center, University of Pittsburgh.

[376] PA Citizen Coalition for Responsible Oil and Gas Legislation Newsletter, May 4 1984. Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016) Box 2, Folder 23, pp. 1-6, Archive Service Center, University of Pittsburgh.

previous ten years. "Sometimes I feel as though I'm not managing a forest anymore," district ranger Paul Brohn remarked, "I'm managing wood lots in between well sites."[377]

The bill sponsored by Heinz and Clinger was the latest move in a long debate over resource extraction in Allegheny National Forest. In the early 1970s, the Sierra Club had fought for wilderness areas there. Pennsylvania Sierra Club chair Wyona Coleman called the proposed legislation a step in the right direction. The Pennsylvania Oil and Gas Association, although opposed to wilderness designation of any land, conceded that the measure would at least have ended the controversy. The bill would have allowed current owners of subsurface rights to develop energy resources with a special permit from the Forest Service. Owners would have been required to follow existing state regulations to control soil erosion. Alternatively, they could have exchanged their holdings for comparable subsoil mineral rights under public land without wilderness designation. In the recreational area, the bill required minimal disruption of forest habitat by energy development. Logging would have been banned.[378]

As moderate as their action was, Heinz and Clinger were fighting against the tide. One problem was that the subsurface rights to nearly all of Allegheny National Forest were in private hands, thus still subject to development. ANF's designation as a federal "further study area" concerning its status as a wilderness area offered no protection. For example, a court confirmed that no additional environmental impact statement was required for ANF's supervisor to issue a

---

[377] The wilderness reserve was principally the Hickory Creek area, but also included several islands in the Allegheny River, about four hundred acres. The recreational area was located along Tracy Ridge. Seth Lubove, "Heinz, Clinger Try to Protect Wilderness Areas," *Pittsburgh Post-Gazette*, July 7, 1981.

[378] Ibid.

drilling permit for twenty-eight new gas wells in 1983.[379] A later plea to block the drilling, mounted by the Sierra Club, the Wilderness Society, the National Audubon Society, Trout Unlimited, and the Pennsylvania Federation of Sportsmen's Clubs, was also rejected in federal court.[380]

Action to make appropriate law dragged on for years after the need was identified. In the meantime, Ronald Reagan won the 1980 presidential election. Reagan supported an anti-environmental policy under the leadership of Environmental Protection Agency head James Watt. Watt's appointment was a blow to conservation and preservation efforts. For example, in the early 1980s, Watt opened up an estimated four million acres of previously protected wildlife refuges to oil and gas exploration. This action reversed a twenty-five-year-old policy of habitat protection, although in some cases, wilderness designation protected the refuges.[381]

Even members of the public who sympathized with the goals of Heinz and Clinger may have judged their efforts as futile. A Pittsburgh Press editorial, although in favor of protecting the pristine Allegheny Front section of ANF, opined that properly done gas drilling "left minimal lasting scars." The author was not optimistic, though, and noted the careless drilling practices in other parts of the forest. He further claimed that designating the area as wilderness would hurt, not help, its preservation. He thought the action would attract a horde of visitors, who would surely destroy what they had come to see.[382]

---

[379] Wyndle Watson, "No Wilderness: All's (About Oil) Wells Along the Allegheny Front," *The Pittsburgh Press*, November 22, 1983. Watson's title evokes the WWI era phrase "all quiet on the western front," also the title of a book by Rilke, indicating a stalemate in a war zone.

[380] "Bar on Oil Wells Rejected," *Pittsburgh Post-Gazette*, January 24, 1984.

[381] "Environmentalists Suing Watt Over Opening of Refuges to Oilmen," *The Pittsburgh Press*, August 28, 1983.

[382] Watson, "No Wilderness."

Nevertheless, state lawmakers continued to advocate for the passage of State Bill 402 that did eventually become the 1984 Pennsylvania Oil and Gas Act. Evidence of water pollution from drilling was the principal argument in favor of legislative control. In the midst of a 1983 debate on the Pennsylvania House floor about regulation of the natural gas industry, Camille 'Bud' George, the ranking Democrat on the House Environmental Resources and Energy Committee, commented on proposed amendments to State Bill 402. He argued that a bill protecting the waters of the Commonwealth from the effects of oil and gas drilling was badly needed to correct a serious ongoing pollution problem. Other representatives emphasized the danger to private water wells. Representative Thomas Michlovic testified that of all the environmental problems the Conservation Committee had investigated in meetings throughout the state, he judged that the worst issues concerned the under-regulated oil and gas industry. Michlovic said that the committee had "heard testimony from witnesses who said that their appliances blew up, their appliances blew up, and they were injured because of the amount of gas that was in their water. It is a serious problem. We have had witnesses who have brought jars of water before the committee that were ignitable."[383] Michlovic's repeated phrase about household explosions emphasized his assessment of the seriousness of the environmental problems associated with the gas industry.

The amendment to H.B. 402 under discussion concerned whether or not the owner of a water well should enjoy a "rebuttal presumption." In short, if the water in a well located within a specified proximity to oil or gas drilling was diminished, lost or polluted, the owner of the water well would be legally entitled to assume that the industrial drilling caused his loss. The burden of proof to the contrary would be on the gas/oil drillers. The representatives who supported this clause

[383] Commonwealth of Pennsylvania Legislative Journal, House of Representatives 168th Session of the General Assembly, no. 59 (1984), 1922.

felt that it was indispensable in protecting the water rights of landowners, many of whom would be unable to afford the expense of pursuing a suit for damages, including hiring geologists and other expert witnesses to prove the source of damage. These legislators had received accounts from landowners who had been able to prove that oil/gas drilling had caused the degradation of their water wells. They had also heard from people who were financially unable to try and get such proof. Obtaining it would cost much more than a new water well, if a new well were an option. The representatives who opposed assigning presumption of guilt to oil and gas drillers in this matter were, ironically, also concerned with water quality. One of the other provisions of the bill mandated the registration of new and old gas wells, so that the Department of Environmental Resources could better monitor them and enforce the capping of exhausted wells, in order to prevent the discharge of subsurface brine into surrounding bodies of water. The opposing representatives felt that owners of gas wells would fail to report well locations for fear of damage claims from water well owners.[384] The debate on the House floor grew heated. In the end the bill passed with the protection of the rebuttal presumption allowed to water well owners. Gas well drilling caused enough environmental damage in the countryside, especially to water, to demand legislative protection for surface owners and ecosystems.

6.3 Allegheny National Forest after the 1984 Oil and Gas Act

Although it fell short of what environmentalists had hoped to accomplish, the passage of the 1984 Oil and Gas Act did provide some standards and controls for the gas industry. However,

---

[384] Ibid., 1923.

in the Allegheny National Forest the new regulations did not prevent the problems that had drawn reformers' attention. The Forest Service itself, which managed ANF, largely accepted drilling as unavoidable and beyond its power to police effectively. The management of the Service did not officially seek increased authority over sub-surface owners, although individual personnel expressed that need.

The Forest Service managers of ANF drafted a new management plan for ANF in the mid-1980s. The plan identified six management issues for ANF; one was "Private Oil and Gas Development." The Forest Service view, stated succinctly, was:

> The private sector owns 96 percent of the oil and gas rights under the Allegheny National Forest. The rate of development of oil and gas deposits is expected to continue for the next 20 years. The Forest Service is legally obliged to allow development of privately-held rights. The Forest Service seeks to lessen the environmental impacts of development by working cooperatively with developers. Alternative policies for managing development were not considered.[385]

The only legal constraints on drillers in the forest would have been any restrictions included in the original mineral rights deed of sale that were negotiated by the surface owner at some time previous to the land's acquisition for ANF.[386] The "adverse effects that cannot be avoided" from oil and gas development included increased erosion and stream sedimentation from road-building, other water pollution, negative changes in scenic views, increased noise, and disruption of use by

---

[385]Larry Henson and Forrest Carpenter, "Overview of the Draft Environmental Impact Statement and the Proposed Land and resource Management Plan: Allegheny National Forest" (United States Department of Agriculture, Forest Service Eastern Region, 1985), 5.

[386] Henson, "Overview of the Draft Environmental Impact," 12.

visitors and wildlife, "to which some people may object."[387] Purchase of mineral rights was judged too expensive. Mitigation of drilling impact would be limited to "a cooperation and education approach." The managers of ANF would also work with state and federal government to protect the environment.[388]

Samuel P. Hays, environmental historian and activist, wrote an extensive critique of the ANF management plan on behalf of the Pennsylvania Sierra Club and the Wilderness Society. He stated that the plan displayed an "unwarranted resignation to the 'unavoidable' environmental degradation of the forest by oil and gas extraction."[389] Hays characterized the forest as overly fragmented by roads, especially private ones that served drillers.[390] He criticized the plan's lack of engagement with the problems of drilling, and apparent expectation that other government agencies would deal with the consequent pollution. In Hays's view, ANF management needed improved systematic monitoring to assess damage to the forest, to provide hard data for "analysis, planning and action." Consistent with the ideas of wilderness protection, Hays called for a plan that would maximize the environmental quality of areas not affected by drilling, to offset the degradation done in drilled areas.[391]

All these efforts by conservationists, legislators, and government agencies during and after the passage of the 1984 Oil and Gas Act did not substantially change the threats to Allegheny

---

[387] Ibid., 19.

[388] Ibid., 24-25.

[389] Samuel P. Hays, "A Review and Critique of the Proposed Land and Resource Management Plan and the Draft Environmental Impact Statement for the Allegheny National Forest," unpublished manuscript, Pittsburgh, Pennsylvania, April 25, 1985. University of Pittsburgh Archives, Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016) Box 3, Folder 6, pp 1, Archives Service Center, University of Pittsburgh.

[390] Hays, "Review and Critique," 8.

[391] Ibid., 20-21.

National Forest. A 1991 federal congressional hearing in Pittsburgh covered all the old problems.[392] The principal issue remained the conflict between public ownership of the ANF surface and the private ownership of subsurface mineral rights. The testimony described the ongoing environmental degradation and the legacy of past drilling. It showed the way regulating agencies come to identify with the needs of industries they regulate.[393] It also showed how the designation of a business as 'small' or owned by the 'little guy' can be used to justify dubious practices. Conversely, it also showed the very real impact on people who had built a livelihood under one set of circumstances, and protested changes that threatened to sacrifice them to a larger good.

Representative Peter H. Kostmayer, a Pennsylvanian Democrat then chairman of the federal House Subcommittee on Energy and the Environment, heard testimony from two panels. One was composed of environmental advocates—recreational users, the Pennsylvania Fish Commission, the Sierra Club, the Pennsylvania Federation of Sportsmen's Clubs, the Pennsylvania Wildlife Federation, and Trout Unlimited. The second panel included representatives of the government agencies responsible for various aspects of park management—the ANF supervisor, the federal Environmental Protection Agency (EPA), Pennsylvania Department of Environmental

---

[392] "Oil and Gas Operations in the Allegheny National Forest, Northwestern Pennsylvania: Oversight Hearing Before the Subcommittee on Energy and the Environment of the Committee on Interior and Insular Affairs, House of Representatives, One Hundred Second Congress, first session, Pittsburgh, PA, September 6, 1991" (United States. Washington: U.S. G.P.O.: 1992), http://hdl.handle.net/2027/pst.000019985350.

[393]The general tendency of regulators to identify with the needs of the industry they oversee is well-recognized. For example, the issue as it applies to the regulation of big pharma is addressed in Institute of Medicine of the National Academies, Committee on the Assessment of the US Drug Safety System Board on Population Health and Public Health Practice, Alina Baciu, Kathleen Stratton, Sheila P. Burke, Eds., *The Future of Drug Safety: Promoting and Protecting the Health of the Public* (Washington, D.C.: The National Academies Press, 2007), accessed January 20, 2019, https://www.nap.edu/read/11750/. For a detailed analysis of how the relationship between the Forest Service and extractive industries functioned in the entire national forest system, see Hays, *The American People and the National Forests*.

Resources (DER), and the United States Army Corps of Engineers (USACE). Kostmayer opened by describing the terrible impact of energy extraction in ANF: polluted streams and dead trees from dumped debris and brine disposal, erosion from substandard roads, and the illegal privatizing of hunting rights. In his view, the Forest Service was not doing enough to enforce existing regulations.[394] The testimony from the first panel corroborated Kostmayer's assessment. Each witness, speaking on behalf of large constituencies, described worsening conditions in ANF caused by gas industry abuses.

Witness Karen Atwood of the Pennsylvania State Snowmobile Association and the Allegheny Trail Committee had been involved in ANF affairs since the 1970s. Atwood reported that loggers and snowmobilers had usually shared forest roads successfully during the winter season, as mandated by ANF regulations. However, oil and gas developers plowed and cindered the roads all winter, which prevented snowmobile use. The Snowmobile Association volunteers had donated labor and money to benefit park roads. Snowmobilers also constructed and maintained trails that drilling companies then ruined on the assumption that subsurface rights superseded control of the surface. Businesses dependent on recreational visitors to ANF suffered when snowmobilers could not use the trails; they came at a time of year when few other tourists visited. Atwood testified that old wells in the lease area remained unplugged, and called for a halt in gas development until these problems were addressed.[395] Atwood reported that Forest Service personnel wished they had more power to control gas activity's widespread problems. She thought steps could be taken to reduce drilling impacts. For example, the Pennsylvania DER was

---

[394] "Oil and gas operations in the Allegheny National Forest," 4-6.

[395] "Oil and gas operations in the Allegheny National Forest," 7-9.

responsible for overseeing sedimentation control, but they apparently had no dedicated personnel in the ANF. [396] Atwood stated that oil drilling had been done for a long time, and previously it was less disruptive. She proposed that the multiple-use policy could be managed as it was in the past.[397]

John Arway represented the Pennsylvania Fish Commission, which was legally responsible for protection of state waterways and aquatic life. He reported that brine waste from drilling was a severe problem; several billion gallons annually were dumped into surface waters. Erosion and sedimentation were also clogging waterways. Arway called for more consistent regulation of development on public and private lands, with damage assessment and appropriate penalties.[398]

Wyona Colman, representing the Pennsylvania Sierra Club's 21,000 members, also argued that the Forest Service must take greater action to preserve the surface users' rights, as provided for by law. She said that the Service approved each separate development without considering the cumulative effects of thousands of wells. She criticized the inadequate level of inspections. She claimed that many current projects were in violation of DER standards, and the companies had no incentive to improve. An example of laxity was a current Pennzoil project for potentially 700 wells. Pennzoil had begun construction of facilities before the review process was complete. Colman insisted that the public must also have free access to drilling locations to monitor gas activity. She called for an effort to acquire the sub-surface rights.[399]

Two representatives of sportsmen's organization addressed the problem of brine and other water pollution. Bonita Hoke, director of the Pennsylvania Federation of Sportsmen's Clubs and

---

[396]Ibid., 42-43.

[397]Ibid., 48-49.

[398]Ibid., 14-15.

[399] Ibid., 18-19.

the Pennsylvania Wildlife Federation, demanded specific written records of where "every gallon" of brine went. She also reported that lease operators were gating off their drilling areas, effectively turning them into private hunting preserves. She called for ANF officials to speak for the "non-commodity benefits" of recreation, and to protect the interests of the many against the few who profited from gas and oil resources.[400] John McKown of Trout Unlimited in Warren County showed a video of leaking brine pollution, in his view the biggest threat to stream quality. He testified that even when spills and pollution were not evident, sedimentation was an ongoing problem, especially from clearing for roads and drill pads. McKown pointed out that even the careful operators do road building and earth moving.[401]

Testimony from the second panel followed. Representatives of government bodies with authority over some aspect of ANF rebutted the previous panel's criticisms. They focused mainly on the legal requirements and constraints of their duties. All stressed that negative impacts of drilling were the legacy of a century of industry activity. David F. Wright, ANF Supervisor, opened by stating that his objective was multiple-use management and environmentally sound resource development according to the formal plan implemented in 1986. He reiterated that oil and gas development long predated establishment of ANF. He stressed that the United States government owned subsurface rights under only 34,000 acres of ANF's total 734,000 acres. The Forest Service must allow "reasonable" access to private mineral owners in the vast majority of the forest.[402]

Charles Kleeman, Chief, Western Response Section of EPA, clarified and defended the agency's activities in ANF. Kleeman was less interested in gas than oil. He said that

---

[400] Ibid., 31-32.

[401] Ibid., 37-38.

[402] Ibid., 50.

Pennsylvania's DER was tasked with regulating effluent discharge by controlling permits; EPA only had oversight. No federal guidelines existed for discharge from 'stripper' oil wells that produced less than ten gallons per day and most ANF wells fell into that category. Pennsylvania was then developing a permit system to cover this particular water quality problem. Permits for injection wells (used for underground disposal of drilling wastewater) required drillers to plug old abandoned wells in their injection field. Hundreds of old wells had been plugged, but many more were in played-out areas of no interest to new operators, and so were not included in the program. The EPA had conducted regular inspections, and accomplished 95 percent of mandated mechanical tests. However, Kleeman pointed out that northwestern Pennsylvania was the oldest oil field in the nation, and old equipment was still in use. He estimated that 250,000 wells had been drilled in the region over the previous hundred years. The regional EPA division was at that time engaged in the "Northwestern Pennsylvania Major Oil Spill Project" a cleanup attempt of numerous small oil leaks classified for efficiency's sake as one large spill. The EPA conducted its mission as a joint effort with industry "responsible parties." The agency had recently taken legal action against two large producers.[403]

Colonel Harold F. Alvord, District Commander of the United States Geological Survey, was brief in his remarks. The USGS interest in ANF was limited to the Kinzua Flood Control project; Alvord declined to comment on any other aspect of the drilling issue.[404] He explained that as part of the Kinzua project, the USGS had plugged more than one hundred old wells in the

---

[403] Ibid., 60-63.

[404] The highly controversial Kinzua Dam on the Allegheny River was constructed in the 1960s to protect the city of Pittsburgh from flooding and to provide recreational opportunities on its man-made lake. See Paul C. Rosier, "Dam Building and Treaty Breaking: The Kinzua Dam Controversy, 1936-1958," *The Pennsylvania Magazine of History & Biography* Vol. CXIX, No 4 (October 1995): 345-368.

planned impoundment area behind Kinzua Dam. After the lake filled, methane bubbling up from the bottom had at times caused thin ice, a potentially dangerous situation. Despite this and other risks such as oil spills, Alvord claimed that it would be too difficult and expensive to plug sources of gas currently under water.[405]

After members of the panel had spoken, Congressman Kostmayer was evidently not satisfied with their testimony, especially that of ANF Supervisor Wright. Kostmayer quoted federal law that empowered Wright to control drilling activity:

> The Secretary of Agriculture shall make provisions for the protection against destruction and depredation upon the public forest and national forest which may have been set aside or which may hereafter be set aside. He may make such rules and regulations and establish such services as will ensure the objects of such reservations; namely, to regulate their occupancy and use and to preserve the forest thereon from destruction.[406]

Wright protested that the quoted provision only applied when the government controlled all aspects of the land. It did not supersede previously held private rights. Wright explained that because only surface ownership of ANF was acquired in the 1920s, the Forest Service could only "negotiate" with the owners of subsurface rights. These owners of mineral rights essentially have the freedom, in fact a "constitutional right" to use the surface in any "reasonable and prudent" way to access their resources. Wright said, "We try to ask and work with the oil and gas operators to just consider the sensitivity of the environment and the ecosystem out there. We will provide the access to your right, but we would like to have you do that in an environmentally sound manner." Wright stated that the service could negotiate and review a plan, but could not "approve" one.

---

[405] "Oil and gas operations in the Allegheny National Forest," 70-72.

[406] Ibid., 76.

Furthermore, Forest Service attorneys had informed Wright that the provisions of the National Environmental Policy Act did not apply to oil and gas activity. Kostmayer replied, "It sounds to me as if you are saying there is not really much you can do" about the environmental problems. Wright disagreed, and declared that conditions had improved. He did not require more authority, and had all the regulatory power he needed from DER and the state Clean Water Act.[407]

Stephen Rhoads, president of the Pennsylvania Oil and Gas Association, also testified. His timing in managing to speak last seemed strategic. Rhoads's statement in defense of current operations in ANF was a skillful leveraging of both the values of gas industry critics and the concerns of those who worked and lived in the region, which included the forest managers. As might be expected, he stressed the economic returns from energy extraction and protested the current regulations as burdensome to small operators who produced oil from marginal 'stripper wells.' Rhoads supported the testimony concerning the legal position of ANF Superintendent Wright. However, he also used a particular environmentally-based argument to defend drilling in ANF. He advocated extraction in the Pennsylvania forest, already a developed region, as a better alternative to opening up new oil fields in wilderness such as the Arctic National Wildlife Refuge (ANWAR).

Rhoads stressed the economic importance of the energy industry in northwestern Pennsylvania to small holders and ordinary citizens, rather than corporate interests. He represented four hundred industry companies and individuals, a large number of which operated in ANF. He said that ongoing oil and gas development had brought $28 million in new investment capital to the region. Oil and gas development generated jobs. About a thousand employees, a quarter of the oil and gas industry labor force in Pennsylvania, worked in and around ANF. Oil income to small

---

[407] Ibid., 76-79.

landholders had a multiplier effect in the local economy, which did not offer many employment opportunities. The oil and gas came mainly from "classic stripper wells." According to Rhoads, these were the "backbone" of Pennsylvania's oil and gas industry.[408] Rhoads claimed that the regulations for wastewater discharge were designed for large municipal and industrial waste treatment operations, not small stripper operations. He listed the expenses involved in legal permitting and implementation, which were $1,000 per pollution point source, and anywhere up to $60,000 in engineering and other professional fees.[409]

Rhoads argued for support of extraction in Pennsylvania and ANF in order to protect new environmentally sensitive areas elsewhere from development. Rhoads strongly agreed with Congressman Kostmayer that stripper well reserves were the "largest domestic source of oil, dwarfing estimates of petroleum that might come from the Arctic National Wildlife Refuge (ANWAR)." He said, "Clearly the environmental risks that are associated with preserving the nation's existing stripper wells infrastructure are trivial in comparison to the kinds of risks that you are concerned in ANWAR and offshore."[410]

Rhoads provided legal details to support Supervisor Wright's view of the legal situation between ANF and the gas and oil industry. The courts, beginning with the 1893 case "Chartiers Block Coal Company v. Mellon, et al," have upheld the right of drillers to determine the number and location of wells and any other infrastructure they deem necessary, although they are directed to prevent any unnecessary disturbance. A 1980 case, "Minard Run Oil Company v. United States of America," dealt directly with oil and gas rights under ANF. The court upheld the subsurface

---

[408] Ibid., 84-85.

[409] Ibid, 119-120.

[410] Ibid., 84-86.

rights previously established. It required drillers to give the surface owner advance notice of their plans to drill, a map of operations, and a detailed plan including a sedimentation control plan. The driller must conform to legal set-back requirements. The surface owner, in turn, may not make any construction, such as buildings or roads, that interferes with drilling operations. As an owner of surface rights, the federal government has no greater standing than any other individual owner.[411] Rhoads claimed that the definition of reasonable and prudent conduct on the part of drilling companies has been established by custom over the last century; the courts recognized and legitimated these customary performance benchmarks.[412] In addition, he said, "cradle to grave" regulation of the drilling industry is contained in an "Oil and Gas Operators Manual" compiled by the Pennsylvania Department of Environmental Resources.[413]

Nevertheless, Congressman Kostmayer remained unsatisfied, and continued to interrogate the agency officials concerning their lack of engagement and dearth of accurate knowledge about environmental degradation in ANF. Wright especially seemed more invested in the rights of subsurface owners. Nothing in the hearing record suggests that Wright had a personal economic interest in energy extraction. Was he following the well-known tendency of government agencies to cooperate with those whom they are supposed to regulate, especially considering the Forest Service's legacy of utilitarian management? Did his stance come from a long habit of needing to remain on good terms with industry representatives in order to negotiate what concessions he could obtain? The oil and gas interests, big and little, were of course listening to Wright's testimony. At

---

[411] Ibid., 90-91.

[412] Ibid., 89.

[413] Ibid., 112.

this point the record contains the following exchange: "A voice from the audience: 'That man [Wright] stood up for our rights and you are putting him down. We are all here to stand up for our rights, and you should be too.'" "Kostmayer: 'Mr. Wright's job is to represent the American people, not the oil and gas industry.'"[414] The problem is that those two categories are not mutually exclusive.

6.4 Conclusion

Pennsylvania remained friendly to the natural gas industry even after the passage of the state's 1984 Oil and Gas Act. A number of factors reduced pressure for more stringent state-wide regulations despite the evidence of serious environmental impacts from natural gas drilling. This chapter shows that the diverse groups of Appalachian scholars, grass-roots activists, and organized environmentalists were more focused either on the social and environmental impacts of coal mining, or on wilderness protection issues. Federal and state agencies working in ANF, Pennsylvania's only national forest, followed a long-standing pattern of cooperation with extractive industry in the nation's oldest gas and oil field. The Appalachian cases examined here demonstrate the priority of private property rights over a public good—even a public good mandated under state law.

Are Pennsylvania's Appalachian gas fields an energy sacrifice zone, part of Appalachia's economic existence as an internal colony? John Alexander Williams, preeminent Appalachian historian for nearly half a century, considers that the colonial characterization works better as an

[414] Ibid., 128.

analogy than an analysis, but is nevertheless an important concept in understanding what has happened in Appalachia and why.[415] Writing during the 1970s, Williams concluded that those who made the colonialism argument, whether they leaned toward socialist or capitalist solutions, left out important points, among them the culture and agency of the inhabitants themselves. Appalachians are not merely oppressed by American power, they are Americans. Williams's evaluation is borne out by the people and events described in this chapter, and the previous one.

The defenders and opponents of gas drilling, resident and non-resident, shared a larger cultural legacy. They used each other's arguments, not only strategically, but honestly based on a shared set of assumptions. Among these are the value of individualism and self-reliance as represented by the 'small independent operator,' and the sanctity of private property with the expectation of a return on investment (which includes the investment of time and emotion). Although they were divided on the issue of conservation versus preservation, they shared a worldview that 'nature' was categorically a space that excluded humans except as visitors.

The environmental activists and forest visitors shared a landscape with the farmers, drillers, and government officials. That landscape contained an immensely valuable geologic inheritance, and a physical legacy of extractive industry. It represented a legal system that had accreted over time. These, the physical landscape of the mountains, the long legacy of extraction, as well as the long legacy of culture, were the structures that constrained the possible responses to the immediate concerns of the day.

These long-term structures limited the choices available to stakeholders in the Appalachians. For example, many thousands of acres of sub-surface mineral rights were already

---

[415] "Appalachia as Colony and as Periphery: A Review Essay," *Appalachian Journal* 6, no. 2 (Winter 1979), 157-161, http://www.jstor.org/stable/40932702.

owned by energy concerns before the drilling boom of the late 1970s and early 1980s. Legal decisions dating back to the 19th century gave the owners of sub-surface rights precedence over interests of surface owners. This was true even on land where the surface was owned by the federal government. Subsurface owners were merely enjoined to avoid unnecessary waste and to use due consideration of the surface owner's interests.

Stakeholders were caught up in more pressing issues—other environmental concerns, the energy crisis, a changing federal regulatory climate, and economic hardship. Under the circumstances, natural gas was a less-threatening part of the business of extraction than other fossil fuels, with the caveat that it should be done properly. Indeed, that last sentence accurately describes the attitude many Pennsylvanians had toward the industry at the beginning of the Marcellus gas boom in 2007, and still have now. The 1984 Oil and Gas Act, the result of attempts to see that gas drilling was done as well as possible, was certainly better than no regulation at all. However, it did not significantly change the prevailing conditions that facilitated the extraction of natural gas in Appalachian Pennsylvania.

7.0 Conclusion

> This is a significant, and obviously testable, hypothesis: did any of the political or cultural movements to temper human action in relation to their surroundings demonstrably change the course of human history, or are the forces of technology, energy use, capitalism, and long-standing philosophies of property ownership largely unaffected? Reduced very nearly ad absurdum, the question becomes: did environmentalism matter? The Mid-Atlantic might be an excellent place to test any answer to these questions . . . Environmental crisis, never too far away, always serves to refocus our interest in a history that explores the foundations and preconditions of that crisis, and while Marcellus shale is our current motivation, the next crisis is surely just around the corner.[416]

In my work, I consider some of the reasons—Longhurst's "foundations and preconditions"—that explain why Pennsylvania remained particularly open to natural gas drilling in the Marcellus play despite two centuries of experience with the impact from gas and from extractive industry of all kinds. True, the adverse effects of an earlier Pennsylvania gas boom following the 1978 federal price deregulation prompted activism that resulted in a new and more restrictive state gas law. The Pennsylvania 1984 Oil and Gas Act was an improvement from an environmental viewpoint. However, it did not really do much to protect people and the environment, as shown by the persistence of the same problems from gas drilling over the last fifty years. To answer Longhurst's question in brief, it appears that environmentalism concerning gas

---

[416] James Longhurst, "'Typically American': Trends in the History of Environmental Politics and Policy in the Mid-Atlantic Region," *Pennsylvania History: A Journal of Mid-Atlantic Studies* 79, no. 4 (2012): 422.

extraction was not very effective. I conclude, to use Longhurst's succinct summary of modern structures, that "the forces of technology, energy use, capitalism, and long-standing philosophies of property ownership [were] largely unaffected" by mid-twentieth century efforts, such as they were, to regulate natural gas drilling.

Furthermore, the mid-Atlantic does offer particular insight into the evolution of extractive energy industries, especially in southwestern Pennsylvania, an early source of all three major fossil fuels. The region's landscape is a palimpsest. Current land uses overlay the evidence of previous human actions, and some records in the body of this large physical text are more visible than others. Interposed with the agricultural, rural, and urban built environments are the mines, wells, and other accumulated structures of fossil fuel extraction. Each subsequent activity added a layer to the complex picture—layers in time and in physical space. The landscape preserves records that may otherwise be overlooked or forgotten.

The Pennsylvania landscape also displays the entangled connections between various aspects of fossil fuel extraction and use. A coal seam could be a marker of likely gas sources, therefore a positive factor in gas production. But coal mining could also produce acid that contributed to the failure of a gas well casing, and leave behind an underground cavern with potential to accumulate dangerously leaking gas. Wells can produce natural gas and salty water, and so, depending on the era and area, drillers who wanted the brine for salt production had a gas problem, while drillers who wanted gas had a brine problem. These ironies are representative of the larger contradictions inherent in the use of fossil fuels, which both support and threaten global industrial civilization.

A distinct pattern emerged from the Pennsylvania case studies in these chapters about prevailing public attitudes for and against gas extraction, and public desire to regulate the gas

industry. The studies show that a difference existed between efforts to protect public commons versus private property. Generally, (with some exceptions) people tended to defend their commons against the gas industry, but were more likely to support gas extraction on private land, as well as on public property that administrators could treat like private land. The exception is in the Pittsburgh metropole, where private and public interests were harder to distinguish and where the existing infrastructure of gas created a level of practical and technical determinism. The pattern was also affected by the differing policies and power of federal, state, and local leadership. These differences helped shape public perceptions of what constituted a common good, versus a legitimate opportunity for private gain.

The effect of gas drilling on water quality was—then as now—the most important incentive for tighter regulation of the gas industry. Private citizens defended their common interest in protecting the drinking water supply, especially because water cannot be contained by the boundaries of private property. Water that smelled and tasted bad or actually caught fire attracted the notice of legislators and mainstream environmental organizations that otherwise paid minimal attention to gas's environmental impact.

Citizens and their local officials objected to gas drilling that would impact their common interest in preserving the recreational value of public land. Residents near Lake Erie and the Allegheny National Forest valued these public areas and in many cases worked to improve the quality of the recreational facilities. Municipal leaders and business owners who were struggling to diversify the economy in the deindustrializing northeast were anxious to attract tourism dollars. Mainstream environment organizations, seeing beyond the economic benefits of recreational use, also valued the ecosystems involved. Of course, none of these particular stakeholders had a financial incentive to facilitate drilling, quite the contrary.

On the other hand, public initiatives to restrict gas drilling on private property were more limited. Property owners in both rural Appalachia and urban Erie expected to have the right to profit from natural gas discoveries. They wanted to be fairly compensated and not subject to unnecessary hazards, but they were on the whole more concerned with the possibility of losing out to their neighbors. The fungible nature and uncertain quantities of the gas supply fed this fear. Certainly the Pennsylvania Citizens Advisory Council and the Pennsylvania Citizen Coalition for Responsible Oil and Gas Legislation advocated better standards for drilling practices. However, unlike the effort to ban drilling in Lake Erie, they did not work to prevent gas drilling. Of course, the lake had none of ANF's long-established private property rights and customary practices that privileged drilling.

Pennsylvania's citizens had several reasons to view gas drilling in a positive light compared to other energy sources. Perhaps the most important reason was the role of natural gas in the fight to clean up Pittsburgh's smoky air. Concerning fossil fuel pollution more generally, in all five case studies examined here natural gas was viewed as less harmful to the environment than oil or coal. In addition, other more pressing concerns eclipsed gas. Issues of social justice did not influence public opinion toward stricter control of drilling. In the case of Erie's poor, ruinous energy prices and an identity based on self-reliance contributed to a positive view of gas extraction. In Appalachia, poverty correlated with energy extraction and an economy with colonial analogs. Nevertheless, those investigating systemic poverty in Appalachia's energy landscape targeted other causes—mining, logging, and mismanaged federal regulations—not natural gas extraction. State-wide, concerns about land use and the environment focused on the damage caused by coal mining, and problems of the built environment—roads, suburbs, factories, power plants, and waste disposal facilities.

Despite the differing positions and agendas of the stakeholders in natural gas issues, they shared some broad assumptions about two basic concepts—property rights and the natural environment. In the argument over protection of natural resources, rights can go two ways: the right to sell resources in the name of personal and community economic development, or the right to limit resource extraction in the name of personal and community quality of life. Advocates on both sides argued for their rights as individuals and sharers in a commons. Stakeholders also shared a basic idea about 'nature,' especially wilderness, as a space that primarily excludes human beings except as visitors. Environmental activists unsurprisingly focused on the desirability of wilderness protection, which had gained greater importance than wise-use conservationism during the mid-century environmental movement. However, advocates for the gas industry also leveraged prevailing ideas about wilderness to defend industry activity in ANF. They argued that drilling ANF, a space with a long history of extraction and therefore not truly wild, was better than opening up pristine Alaskan wilderness to drilling.

This project is an initial effort to examine the actions and motivations of numerous stakeholders involved in natural gas extraction, and to investigate how they influenced the conditions that eventually governed the Marcellus boom. Considering the nearly complete lack of scholarly attention to gas drilling in the last third of the twentieth century (except for the federal price control controversy), a significant part of the story is not yet told. A more complete picture might be gained by a closer examination of groups this work so far only touched upon. One such group, for example, is the operators of "stripper wells." They were the local oil and gas producers that persisted in operating marginal wells after Pennsylvania was no longer the major gas and oil producing state. Their presence shows that the drilling industry was not a monolithic category. The major gas producers hid behind them, in a sense. The spokesman for the national petroleum and

gas organization, which represented major industry players, objected to more stringent regulations that posed unacceptable economic hardships for what were essentially 'mom and pop' operations. These wells generated small returns, but they also produced serious pollution. However, in Pennsylvania their owners were numerous and commanded some public sympathy as beleaguered 'little guys'. The plight of independent small-scale producers was one more factor that worked against state efforts to reduce the environmental impact of gas extraction, and so kept Pennsylvania driller-friendly. In addition, stripper activity added to the gas pipeline infrastructure that helped facilitate the recent boom.

Another group worth further investigation is rural women, who complicate the idea of farmers as a homogenous block. Their story may be somewhat difficult to separate from other rural actors. Nevertheless, given the role of women environmentalists—concerning coal mining and air pollution issues, for example—this is a narrative I intend to pursue. Certainly the advice to landmen about avoiding the ladies indicates that the industry believed women did not always view drilling in the same light that men did. Women complained about pollution. An important related investigation beyond the scope of this work is a digital mapping project of citizen complaints. It will correlate reports of suspected drilling pollution with existing data bases of oil and gas well locations, and also with county-level patterns of health problems. The complaints, housed at the Pennsylvania State Archives, are in the form of letters and memos received by regional state agencies, such as the northeastern division of the Bureau of Oil and Gas Management, which became part of the Pennsylvania Department of Natural Resources. The memos usually include the name and address of the person—often a woman—who contacted the agency, the date and location of the problem, and any action taken by the state. The data from the documents may show correlations between gender, official response, and health issues in areas with high well numbers.

The letters and memos may represent the voices of individuals who were affected by drilling, but not in ways that were obvious or dramatic enough to make the news.

The history of natural gas in Pennsylvania has larger implications than local impacts, as the need to reduce fossil fuel use grows more urgent. That history can provide a clearer understanding of the factors that drive or impede energy transitions, the significant shifts between primary energy sources. The inescapable continuities and contingencies of Pennsylvania's energy legacy demonstrate that these factors are necessary for a complete story of the transitions. Over the last 150 years, the factors that influenced the choice of a particular fuel started with economics, but also included contingencies like national politics, local activism, unexpected discoveries, technical developments, available infrastructure, corporate power and public awareness.[417]

People need sources of fuel to power their lives, yet each type of energy extraction and use has a long-lasting physical effect on the environment. Each comes with disadvantages and unintended consequences. In western Pennsylvania, one increasingly important energy source has on occasion quite literally exploded underfoot. The threat of climate change makes clear the urgent need to accomplish an energy transition away from fossil fuels. In that transition, natural gas is likely to play a key role. The history of natural gas in Pennsylvania is therefore a valuable source of insight concerning that global problem. Among the persistent legacies of Pennsylvania's energy history is a particular habit of mind. Although people may be aware of problems, they seem by long habit to get used to them, just learn to live with them, if they even feel like they have a choice. The layering of coal and rural and urban settlement with gas extraction has rendered people accustomed or oblivious to serious dangers from the use of fossil fuels. The activities and

---

[417] Smil, *Energy Transitions,* thoroughly covers the subject, and explains why it is important to understand the process in order to guide the expectations and goals of the transition from fossil fuels to alternate renewables.

infrastructure of the gas industry in Westmoreland County or South Park did not seem out of the ordinary to real estate developers or the people living there. Energy infrastructure that once made sense may become more dangerous over time, without nearby people really noticing it. That habit of mind is a local example of a very widespread attitude, in which it is possible to ignore the hazards of fossil fuels because using them feels so normal and inevitable. That feeling may not be the least of the factors impeding the next energy transition. The public and political will in America, at the moment, does not appear sufficient to seize the opportunities for new ways to power global civilization.

Bibliography

15,600 Sign Petition Against Lake Drilling." *Morning News*, April 25, 1968.

"35 More Sue Over South Park Gas Explosion," *Pittsburgh Post-Gazette*, Apr. 4, 1991.

"37 Offshore Blocks: Open Drilling Bids Apr. 9." *Times*, March 15, 1968.

A Land Use Strategy for Pennsylvania: A Fair Chance for the "Faire Land" of William Penn. Pittsburgh, PA: Pennsylvania Land Policy Project, 1975.

Ackerman, Jan. "Evacuees Sue Over Gas Well Explosion." *Pittsburgh Post-Gazette*, Mar. 12, 1991.

---. "Residents Sue for Damages in South Park Gas Well Blast." *Pittsburgh Post-Gazette*, Mar. 12, 1991.

"Active Oil and Gas Wells a Fact of Life in Pennsylvania." *Beaver County Times*, Jan. 14, 1991.

"Advantages of Drilling." *Morning News*, February 20, 1968.

"Agent Explains Oil and Gas Leases." *Lancaster Farming*, September 12, 1981.

Agricultural Law Resource and Reference Center. "The Rule of Capture in Pennsylvania Oil and Gas Law" (Penn State Dickinson School of Law, 2010). Accessed November 18, 2018. https://pennstatelaw.psu.edu/_file/aglaw/Rule_of_Capture_in_Pennsylvania_Oil_and_Gas_Law.pdf.

"Agriculture to Get Top Priority Under Senate Compromise Gas Bill." *Lancaster Farming,* September 23, 1978.

Allen, Liz. "Hopes for School Gas Wells Pinned on Experiment." *Morning News*, August 20, 1985.

Anglestein, Dick. "Adequate Supplies but Higher Fertilizer Prices for 1980," *Lancaster Farming,* March 1, 1980.

"Appalachia as Colony and as Periphery: A Review Essay." *Appalachian Journal* 6, no. 2 (Winter 1979): 157-161. Accessed: 5-11-2017. http://www.jstor.org/stable/40932702.

"Bar on Oil Wells Rejected." *Pittsburgh Post-Gazette*, January 24, 1984.

Baciu, Alina, Kathleen Stratton, Sheila P. Burke, eds. *The Future of Drug Safety: Promoting and Protecting the Health of the Public."* (Washington, D.C.: The National Academies Press, 2007). Accessed January 20, 2019. https://www.nap.edu/read/11750/.

Bair, Sally. "Energy Crisis Contemplated." *Lancaster Farming,* February 19, 1977.

Barcousky, Len. "Eyewitness 1927: Big Bang Hammers North Side Hard." *Pittsburgh Post-Gazette,* Nov. 13, 2011. http://www.post-gazette.com/local/community-eyewitness/2011/11/13/Eyewitness-1927-Big-bang-hammers-North-Side-hard/stories/201111130196.

"Bayfront Gas Well Topic of Meeting." *Morning News,* February 20, 1980.

Benson, Mary. "Gas Drilling Rules Favored." *Times-News*, June 20, 1981.

Berry, Wendell. *The Unsettling of America: Culture and Agriculture.* San Francisco: Sierra Club Books,1996.

"Bill Forbids Drilling." *Times*, March 20, 1968.

"Board, Council Meeting Over Well Drilling." *Times*, August 22, 1984.

Black, Brian and Marcy Ladson. "The Legacy of Extraction: Reading Patterns and Ethics in Pennsylvania's Landscape of Energy." *Pennsylvania History: A Journal of Mid-Atlantic Studies* 79, no. 4 (2012): 377-394.

Black, Brian. *Petrolia: The Landscape of America's First Oil Boom.* Baltimore: Johns Hopkins University Press, 2000.

Brier, Bill. "Regulations Blamed for Natural Gas Shortage: What Does This Mean for Agriculture." *Lancaster Farming,* October 4, 1975.

Brotzman, W. S. "Damaging Gas Explosion at Pittsburgh, PA." *Monthly Weather Review.* Weather Bureau, Jan. 25, 1928. doi:10.1175/1520-0493(1927)55<500a:DGEAPP>2.0.CO;2.

Burns, Shirley Stewart. *Bringing Down the Mountains: The Impact of Mountaintop Removal on Southern West Virginia Communities.* West Virginia University Press, 2007.

Carpenter, Mackenzie. "Delay in Returning Home Frustrates Evacuees." *Pittsburgh Post-Gazette*, Jan. 8, 1991.

"Case Introduces New Field Cultivators," *Lancaster Farming*, September 26, 1987, D6. Accessed January 6, 2018.

"Case Offers Extended Repair Coverage." *Lancaster Farming*, June 29, 1985.

Cass, Andrew. "Landman's Manual Reveals Natural Gas Industry Secrets." *Voices of Central Pennsylvania*, May 20, 2011. Accessed March 3, 2014. http://voicesweb.org/landman's-manual-reveals-natural-gas-industry-secrets.

Castaneda, Christopher J. and Joseph A. Pratt. *From Texas to the East: A Strategic History of Texas Eastern Corporation.* College Station: Texas A&M University Press, 1993.

Chittister, Joan. Benetvision, 2015. Accessed November 17, 2017. http://www.joanchittister.org/about-joan-chittister.

Citizen's Advisory Council to the Pennsylvania Department of Environmental Resources, "An Evaluation of Environmental Impacts of Oil and Gas Production in Pennsylvania and Pennsylvania's Oil and Gas Regulatory Program." September 1981. Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016), Box 2, Folder 23. Archive Service Center, University of Pittsburgh.

"City Drilling Rules Fought by Residents." *Morning News*, December 3, 1981.

Clark, Bryan M. et al. *Dirty Drilling: The Threat of Oil and Gas Drilling in Lake Erie.* Cleveland Heights, Ohio: Ohio Public Interest Research Group Education Fund Policy Paper, 2002. www.ohiopirg.org.

"Clark Doesn't See Drilling Danger." *Morning News*, April 22, 1968.

"Commissioners Cite Dangers on Drilling." *Morning News*, April 17, 1968.

Commonwealth of Pennsylvania, Department of Conservation and Natural Resources, Presque Isle website. Accessed November 9, 2018. https://www.dcnr.pa.gov/StateParks/FindAPark/PresqueIsleStatePark/Pages/WildlifeWatching.aspx.

Commonwealth of Pennsylvania Legislative Journal, House of Representatives 168th Session of the General Assembly, no. 59, 1984.

"Congressman Warns Farmers Not to Depend on Natural Gas." *Lancaster Farming,* April 30, 1977.

"Consultant Warns City of Depleting Gas Supply." *Times-News*, September 9, 1985.

Conan, Neal. "Politics of Oil." *Truth, Politics and Power*. National Public Radio. Episode 49, March 2, 2018. https://truthpoliticsandpower.org/politics-of-oil/.

Conklin, Paul K. *A Revolution Down on the Farm: The Transformation of American Agriculture Since 1929.* Lexington: University of Kentucky Press, 2008.

Corbran, Paul. "Business Manager Recommends Opposing Any Variance for Zoo Well." *Times*, August 7, 1984.

---. "School Board Seeks Meeting with Council over Zoo Gas Well." *Times*, August 13, 1984.

---. "Zoo Gas Well Turning into Hornets' Nest." *Times*, August 3, 1984.

"County Asks Ruling on Ballot Question." *Times*, March 20, 1968.

County of Greene, Pennsylvania. "About Greene County Communities, History & Government, Pennsylvania." Last modified Feb. 11, 2015. www.co.greene.pa.us/secured/gc2/history/aboutGC.htm.

Cronan, William. "The Trouble with Wilderness," *Uncommon Ground: Rethinking the Human Place in Nature.* Edited by William Cronan. New York: W. W. Norton & Company, 1996.

Cronon, William, ed. *Uncommon Ground: Rethinking the Human Place in Nature*. New York: W. W. Norton & Company, 1996.

Davis, Kathleen J. "Only 11 Percent of Pennsylvania's Natural Gas Pipelines Are Mapped for The Public." WESA: *All Things Considered.* National Public Radio, September 17, 2018. http://www.wesa.fm/post/only-11-percent-pennsylvanias-natural-gas-pipelines-are-mapped-public?utm_source=inboxedition&utm_medium=email#stream/0.

Dieterich-Ward, Allen. *Beyond Rust: Metropolitan Pittsburgh and the Fate of Industrial America.* Philadelphia: University of Pennsylvania Press, 2016.

"DOE to Study Erie Gas Wells." *Times*, January 23, 1980.

"Driller Slams DOE Gas Well Proposals." *Times*, May 15, 1980.

"Drilling Bids Awarding Delayed Indefinitely." *Times*, April 5, 1968.

"Drilling Discussion Suggested." *Morning News*, March 5, 1968.

"Drilling Halt Unwise." *Times*, September 30, 1983.

"Drilling Information Requested by Tullio." *Morning News*, February 1, 1968.

"Drilling Opposition Continues." *Morning News*, February 26, 1969.

"Drilling Petitions Available." *Morning News*, April 18, 1968.

"Drilling-Bid Opening Today; Local Opponents to Meet." *Morning News*, April 9, 1968.

Driver, Julia. "The History of Utilitarianism," *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, 2009. http://plato.stanford.edu/archives/sum2009/entries/utilitarianism-history/.

Eastern Mineral Law Foundation, Peter S. Wellington, President, *Special Institute: "The Oil and Gas Lease,"* November 4-5, 1981.

"End the Duplication." *Times*, May 28, 1968.

"Energy and the Aged: The Widening Gap." Hearing before the Special Committee on Aging. (United States Senate, 97th Congress, Second Session. Erie PA, February 19, 1982).

Engelder, Terry. Penn State Home Page. Accessed October 11, 2018. http://www3.geosc.psu.edu/~jte2/.

"Environmentalists Suing Watt Over Opening of Refuges to Oilmen," *The Pittsburgh Press*, August 28, 1983.

"Erie City Engineer Gathering Data for Gas Drilling Law." *Times*, March 18, 1980.

"Erie Convent Drills Well, Has Own Gas Supply." *The Pittsburgh Press*, March 27, 1980.

"Erie Could Be the Loser." *Times*, April 30, 1968.

"Erie Historical Marker." Explore PA History. Accessed February 20, 2019. http://explorepahistory.com/hmarker.php?markerId=1-A-C1.

Erie Maritime Museum, 2017. Accessed October 3, 2017. http://www.flagshipniagara.org/us-brig-niagara/flagship-niagara-about/.

Evans, J. Kenneth. "Gas Leak Is Traced, Families Can Return." *Pittsburgh Post-Gazette*, Jan. 1, 1991.

Federal Home Loan Mortgage Corporation: Freddie Mac. "30-Year Fixed-Rate Mortgages Since 1971." Accessed November 14, 2017. http://www.freddiemac.com/pmms/pmms30.html.

Federal Response to Rising Natural Gas Prices in Northwestern Pennsylvania: Hearing Before a Subcommittee of the Committee on Government Operations, House of Representatives, Ninety-eighth Congress, second session, February 13, 1984. United States. (Washington: U.S. G.P.O.,1984). http://hdl.handle.net/2027/pur1.32754075439392.

Final Programmatic Environmental Impact Statement: U.S. Lake Erie Natural Gas Resource Development. U.S. Army Corps of Engineers, Buffalo District and the U.S. Environmental Protection Agency, Great Lakes National Program Office, 1982.

"Foes of Drilling Slate Meeting." *Times*, May 8, 1968.

Fraser, Jeffrey. "New Leaks Point to Well as Cause of Gas Explosion." *The Pittsburgh Press*, Jan. 7, 1991.

Freedman, David A. "Ecological Inference and the Ecological Fallacy." *International Encyclopedia of the Social & Behavioral Sciences,* Technical Report No. 549, 15 October 1999. Accessed February 15, 2019. https://web.stanford.edu/class/ed260/freedman549.pdf.

Gamper-Rabindram, Shanti, ed., *The Shale Dilemma: A Global Perspective on Fracking & Shale Development.* Pittsburgh University Press, 2018.

"Gas Company Starts Drilling Without a Permit," *Times-News*, April 10, 1985.

"Gas Deregulation Asked For." *Lancaster Farming*, December 6, 1975.

"Gas well Plugged to End Foul Odors." *Pittsburgh Post-Gazette*, November 17, 1982.

Garard, Ira D. "Greene County, Pennsylvania, 1890-1918." *The Western Pennsylvania Historical Magazine* 63, no. 2 (April, 1980), 141-154.

Garcia, Dick. "Gas Well for School a 'Real Bonanza.'" *Erie Daily Times*, March 26, 1981.

Gasland, directed by Josh Fox. New York: Video Group, 2010.

Geisler, Charles C. and the Appalachian Land Ownership Task Force. *Who Owns Appalachia?: Land Ownership and Its Impact.* The University Press of Kentucky, 1983.

General Assembly of Pennsylvania, House Bill No. 461, Session of 1969, Printer's No. 532.

General Assembly of Pennsylvania. Senate Bill No. 402, Session of 1983. Accessed February 24, 2014. http://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?syear=1983&sind=0&body=S&type=B&bn=0402.

Gold, Russell. *The Boom: How Fracking Ignited the American Energy Revolution and Changed the World.* New York: Simon & Schuster, 2015.

Graetz, Michael. *The End of Energy: The Unmaking of America's Environment, Security, and Independence.* Cambridge: Massachusetts Institute of Technology Press, 2011.

Grant, Julie. "Historian Makes Case," The Allegheny Front. Accessed February 19, 2019. http://www.alleghenyfront.org/story/historian-makes-case-tougher-fracking-laws-pa#sthash.SlxBnVCr.dpuf.

Grazier, Jack. "City Gives Couple Bonanza; A Producing Gas Well." *Times,* September 15, 1983.

---. “Ordinance Would Protect City of Erie in Selling Gas.” *Erie Daily Times*, September 11, 1985.

Grazier, Jack. “Regulation Hits Snag.” *Times*, September 16, 1983.

Greener, Ian. “Path Dependence.” *Encyclopedia Britannica*. Accessed 11/1/2018. https://www.britannica.com/topic/path-dependence.

“Groups Voice Drilling Support at Commissioners Meeting,” *Times*, May 1, 1968.

Groucutt, Paul. “Gas Drilling Ordinance Passed by Council.” *Morning News*, January 28, 1982.

---. “Gas Wells Expensive, but Becoming Popular.” *Times-News*, February 23, 1980.

Guerriero, John. “NFG Wins Ruling to Drill Well in Erie.” *Morning News*, April 4, 1985.

Hall, Keith B. “The Application of Oil & Gas Lease Implied Covenants in Shale Plays: Old Meets New.” *Energy & Mineral Law Institute* 32 no.8 (2011).

Hardin, Garrett. “The Tragedy of the Commons.” *Science* 162, no. 3859 (13 December 1968): 1243-1248.

Haurwitz, Ralph and Martin Smith. “Bruin Lagoon Cleanup May Begin in Spring,” *The Pittsburgh Press*, Dec 21, 1982.

---. “Presque Isle Park Gas Well Plugged.” *The Pittsburgh Press*, November 16, 1982.

---. “Victims of Gas Explosion Angry, Thankful.” *The Pittsburgh Press*, Jan. 16, 1991.

---. “Well Is Far from Being Plugged.” *The Pittsburgh Press*, Jan. 26, 1991.

Hays, Samuel P. *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955-1985.* New York: Cambridge University Press, 1987.

---. “A Review and Critique of the Proposed Land and Resource Management Plan and the Draft Environmental Impact Statement for the Allegheny National Forest.” unpublished manuscript, Pittsburgh, Pennsylvania, April 25, 1985. University of Pittsburgh Archives, Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016) Box 3, Folder 6, Archives Service Center, University of Pittsburgh.

---. *The American People and the National Forests: The First Century of the U. S. Forest Service.* University of Pittsburgh Press, 2009.

“Hearing on Drilling Suit Scheduled for April 17.” *Morning News*, April 10, 1968.

Henson, Larry and Forrest Carpenter. "Overview of the Draft Environmental Impact Statement and the Proposed Land and resource Management Plan: Allegheny National Forest." United States Department of Agriculture, Forest Service Eastern Region, 1985.

Hopey, Don. "Westmoreland Residents Worried About Effects of Pipeline Explosion." *Pittsburgh Post-Gazette*, May 11, 2016.

Hrastar, John. *Liquid Natural Gas in the United States: A History.* Jefferson, North Carolina: McFarland & Co., 2014.

Hufford, Mary. "Reclaiming the Commons: Narratives of Progress, Preservation, and Ginseng." ed. Benita Howell, *Culture, Environment, and Conservation in the Appalachian South.* Chicago: University of Illinois Press, 2002.

Hurdle, John. "Fracking Under Historic Farm," *New York Times*, March 1, 2012.

James, Kent MacIntyre. "Public Policy and The Postwar Suburbanization of Pittsburgh, 1945-1990." PhD diss., Carnegie Mellon University, 2005.

"Immediate Action Urged on House Bill." *Times*, March 29, 1968.

"Impact Study Released on Gas in Lake Erie." *The Times*, November 17, 1981.

"Industry, City, Schools to Investigate Drilling." *Morning News*, May 14, 1980.

Joint Legislative Air and Water Pollution Control and Conservation Committee, "Public Hearing on Natural Gas Drilling in Lake Erie." March 3, 1977.

Jones, Jr., R. Lamont. "Blast Is Latest Woe to Befall Housing Plan." *The Pittsburgh Press*, Jan. 17, 1991.

"July 15 Last Day to File for Natural Gas." *Lancaster Farming,* July 14, 1979.

Keller, Esq., John K. "Drafting of the Modern Oil and Gas Lease." Eastern Mineral Law Foundation, Peter S. Wellington, president, *Special Institute: "The Oil and Gas Lease"* (November 4-5, 1981).

Kholos, Len. "Erie's Atop Gas Pocket; Let's Leave It That Way." *Times-News*, April 17, 1985.

Knight, Jasper. "Development of Palimpsest Landscapes." *Vignettes: Key Concepts in Geomorphology*. The Science Education and Research Center at Carlton College. Last modified November 15, 2016. http://serc.carleton.edu/vignettes/collection/67822.html.

Krieg, Dieter. "Farmers Given Glimpse of Fertilizer Future." *Lancaster Farming*, March 11, 1978.

"Lake Erie Clear for Gas Drilling, Engineers Report." *The Pittsburgh Press*, June 30, 1982.

"Lake-Drilling Opponents Launch Petition Campaign." *Morning News*, April 11, 1968.

"Leases Can Mean Extra Money," *Lancaster Farming*, September 26, 1981, D19. Accessed January 6, 2018.

Le Guin, Ursula K. *The Real and the Unreal: The Selected Short Stories of Ursula K. Le Guin.* New York: Saga Press, 2016. "Literature Available on Case IH Windrowers." *Lancaster Farming*, September 12, 1987.

Lemon, James T. *The Best Poor Man's Country: A Geographical Study of Early Southeastern Pennsylvania.* Baltimore: The Johns Hopkins Press, 1972.

Leopold, Aldo. *Sand County Almanac.* New York: Random House, 1966.

Lewis, Helen Matthews, Linda Johnson and Donald Askins, *Colonialism in Modern America: The Appalachian Case.* Boone, North Carolina: The Appalachian Consortium Press, 1978.

Litvak, Anya. "Natural Gas Well Explosion in Westmoreland County." *Pittsburgh Post-Gazette*, April 29, 2016.

Longhurst, James. "'Typically American': Trends in the History of Environmental Politics and Policy in the Mid-Atlantic Region." *Pennsylvania History: A Journal of Mid-Atlantic Studies* 79, no. 4 (2012): 409-427.

---. *Citizen Environmentalists.* Lebanon, New Hampshire: University Press of New England, Tufts University Press, 2010.

Lubove, Seth. "Heinz, Clinger Try to Protect Wilderness Areas." *Pittsburgh Post-Gazette*, July 7, 1981.

Magoc, Chris J. "In Search of a Useable, Hopeful Environmental Narrative in the Mid-Atlantic." Special Issue, *Pennsylvania History: A Journal of Mid-Atlantic Studies* (Summer 2015): 314-328.

"Mayor Seeks Facts in Lake Drilling." *Times-News*, February 4, 1968.

"Mayor Threatens Court Suit if State Accepts Drilling Bids." *Times*, March 29, 1968.

"Mayor Tullio May Appeal Results of Drilling Case." *Morning News*, May 1, 1968.

McGraw, Seamus. *The End of Country: Dispatches from the Frack Zone.* New York: Random House, 2011.

McGregor, D. L. *An Examination of Issues Related to U.S. Lake Erie Natural Gas Development.* U.S. Army Corps of Engineers, Buffalo District and the U.S. Environmental Protection Agency, Great Lakes National Program Office, 1982.

McKinney, Bill. "Zoo Officers Face Angry Erie Officials." *Morning News*, August 17, 1984.

McQuillen, Michael J. and William P. Garvey. *The Best Known Name in Paper: Hammermill, A History of the Company*. Erie: Hammermill Paper Company, 1985.

Merchant, Carolyn. *The Death of Nature: Women, Ecology, and the Scientific Revolution.* New York: Harper Collins, 1980.

Messersmith, Dave. "Negotiating Pipeline Rights-of-Way in Pennsylvania," Penn State Extension. Accessed March 3, 2018. https://extension.psu.edu/negotiating-pipeline-rights-of-way-in-pennsylvania.

Millcreek Township, Erie County Pennsylvania Official Website. Accessed October 1, 2017. http://www.millcreektownship.com/Home.aspx.

Miller, Char. *Gifford Pinchot and the Making of Modern Environmentalism.* Washington DC: Island Press, 2001.

Miller, George. "Background: Interest in Airport Wells Goes Back to 1980." *Times-News*, July 17, 1985.

---. "City Council Asked to Alter Drilling Law." *Times*, December 3, 1981.

---. "City Will Appeal Ruling." *Erie Daily Times*, April 4, 1985.

---. "Drilling Law Passes First Test." *Times*, November 18, 1981.

---. "Gas Company Starts Drilling Without Permit; City Vows Legal Action." *Erie Daily Times*, April 10, 1985.

---. "Gas Well Could Be Bonanza for Erie Airport Authority." *Times-News*, March 3, 1985.

---. "Law Gives Local Gas Well Regulatory Powers to DER." *Erie Daily Times*, March 13, 1985.

---. "NFG Stops Drilling," *Erie Daily Times*, April 11, 1985.

---. "Tullio Withdraws Proposal Permitting Commercial Gas Wells Within City." *Erie Daily Times*, February 3, 1985.

---. "Zoo Gas Well Shut Off Until Dispute Settled." *Times*, August 17, 1984.

Montrie, Chad. *To Save the Land and People: A History of Opposition to Surface Coal Mining in Appalachia.* University of North Carolina Press, 2003.

Morrison, Ernest. . . . *a Walk on the Downhill Side of the Log: The Life of Maurice K. Goddard*. Mechanicsburg, Pennsylvania: The Pennsylvania Forestry Association, 2000.

"Most Dairy Farms Exit Business Since 2007." *Hoard's Dairyman,* March 10, 2014.

Muller, Mary. *"A Town at Presque Isle": A Short History of Erie, Pennsylvania to 1980.* Erie County Historical Society, 1991.

National Ocean Policy Coalition. "Groups Around the Country Applaud New Executive Action." June 22, 2018. Accessed November 8, 2018. http://oceanpolicy.com/2018/06/22/groups-around-the-country-applaud-new-executive-action/.

"Natural Gas Shortage Possible this Winter." *Lancaster Farming,* October 25, 1976.

New York Times. Drilling Down. Accessed February 24, 2014. http://www.nytimes.com/interactive/us/DRILLING_DOWN_SERIES.html.

Nicoll, Jackie. "Regulating of Gas Wells Proposed." *Pittsburgh Post-Gazette*, Jan. 17, 1991.

Niederberger, Mary. "75 South Park Families Evacuated Due to Blast." *The Pittsburgh Press*, December 29, 1990.

Northeast Regional Center for Rural Development. "Boomtowns and Natural Gas: Implications for Marcellus Shale Local Governments and Rural Communities." Edited by Jeffrey Jaquet. Pennsylvania State University: NERCRD Rural Development Paper no. 43, Pennsylvania State University, January 2009. http://www.nercrd.psu.edu.

"Oil and gas operations in the Allegheny National Forest, northwestern Pennsylvania: oversight hearing before the Subcommittee on Energy and the Environment of the Committee on Interior and Insular Affairs, House of Representatives, One Hundred Second Congress, first session, Pittsburgh, PA, September 6, 1991." (United States. Washington: U.S. G.P.O., 1992). http://hdl.handle.net/2027/pst.000019985350.

"Oil, Garbage and Milk – They're All in the Pipeline." *Lancaster Farming*, June 25, 1983, B10. Accessed January 6, 2018. http://digitalnewspapers.libraries.psu.edu/Olive/APA/lancasterfarming/?skin=lancasterfarming#panel=document.

"Old Oil Well Pollution Suspect." *Warren Times-Observer*, January 28, 1984.

PA Citizen Coalition for Responsible Oil and Gas Legislation Newsletter. April 28, 1983. Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016), Box 2, Folder 23. Archive Service Center, University of Pittsburgh.

PA Citizen Coalition for Responsible Oil and Gas Legislation Newsletter. May 4 1984. Sierra Club of Pennsylvania Papers 1970-1997 (AIS 200016) Box 2, Folder 23. Archive Service Center, University of Pittsburgh.

Paster, Amy L. and Sue Kellerman. *Pennsylvania State University Libraries Digital Newspapers*, Accessed March 20, 2014. http://digitalnewspapers.libraries.psu.edu/Default/Skins/lancasterfarming/Client.asp?skin=lancasterfarming.

Pennsylvania Agriculture History Project. "Pennsylvania's Historic Agricultural Regions." Pennsylvania Historical & Museum Project. Accessed March 21, 2014. http://www.portal.state.pa.us/portal/server.pt/community/pennsylvania%27s_agricultural_history/2584.

Pennsylvania Citizens Advisory Council Website. Accessed April 4, 2018. http://www.dep.pa.gov/publicparticipation/citizensadvisorycouncil/pages/default.aspx.

Pennsylvania General Assembly, Bill and Amendments, Bill Information, Regular Session 1969-1970, House Bill 461. Accessed October 1, 2017. http://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?sYear=1969&sInd=0&body=H&type=B&bn=0461.

Pennsylvania Historical and Museum Commission, Agriculture History Project. "Historic Agricultural Resources of Pennsylvania, 1700-1960: A National Register Multiple Property Documentation Form, MPDF Introduction and Overview." Accessed April 1, 2014. http://phmc.info/aghistory.

Pennsylvania Land Policy Project. *A Land Use Strategy for Pennsylvania: A Fair Chance for the "Faire Land" of William Penn.* Pittsburgh, PA: The Project, 1975.

Perry, Simona L. "Using Ethnography to Monitor the Community Health Implications of Onshore Unconventional Oil and Gas Developments: Examples from Pennsylvania's Marcellus Shale." *New Solutions: Scientific Solutions* 23 no. 1 (2013): 33-53.

Philips, Susan and Reid Frazier. "Natural Gas Pipeline Blast in Beaver County Prompts Evacuation." National Public Radio: State Impact Pennsylvania, September 10, 2018. https://stateimpact.npr.org/pennsylvania/2018/09/10/natural-gas-pipeline-blast-in-beaver-county-prompts-evacuation/.

Phillips, Susan. "Pipelines: The New Battleground Over Fracking" National Public Radio: State Impact, April 2, 2015. Accessed March 7, 2018. https://stateimpact.npr.org/pennsylvania/2015/04/02/pipelines-the-new-battleground-over-fracking/.

Pittsburgh Post-Gazette. Pipeline. Accessed February 24, 2014. http://pipeline.post-gazette.com/.

Pratt, Joseph, Martin Melosi, and Kathleen Brosnan, eds. *Energy Capitals: Local Impact, Global Influence.* Pittsburgh University Press, 2014.

Presque Isle, Erie PA. "Park History." Accessed July 17 2017. http://www.presqueisle.org/about/park-history/.

"Public Hearings Slated for Natural Gas Use." *Lancaster Farming*, December 2, 1978."Reagan's 'New Federalism'." *Editorial Research Reports 1981*, I (Washington, DC: CQ Press, 1981): 249-268. http://library.cqpress.com/cqresearcher/cqresrre1981040300.

"Reasons Sought for Gas Well Explosion." *Times*, May 1, 1984.

"Report approves drilling for gas in Lake Erie." *Pittsburgh Post-Gazette*, March 15, 1982.

Ristau, Del. "Chandlers Valley Residents Demanding Drilling Law," *Warren Times-Observer*, January 24, 1984.

---. "Water Problems Strike Clarendon." *Warren Times-Observer*, January 24, 1984.

"Robie Plans Trip, Talks on Drilling." *Times*, January 14, 1968.

Robinson, Michael C. "The Relationship Between the Army Corps of Engineers and the Environmental Community, 1920–1969." *Environmental History Revue* 13, no. 1 (1989).

Rome, Adam. *The Genius of Earth Day: How a 1970 Teach-In Unexpectedly Made the First Green Generation.* New York: Hill and Wang, 2013.

Rosier, Paul C. "Dam Building and Treaty Breaking: The Kinzua Dam Controversy, 1936-1958." *The Pennsylvania Magazine of History & Biography* CXIX, no. 4 (October 1995): 345-368.

"Safety Factor: Erie May Regulate Drilling of Natural Gas Wells." *Morning News*, February 22, 1980.

Schaeffer, Laurel. "Berks Forms Energy Group." *Lancaster Farming*, January 23, 1982.

Schmidt, Thomas M. and Helen S. Cordell. "Laws Which Regulate Land Use in Pennsylvania," *The Pennsylvania Land Policy Project.* Harrisburg: Pennsylvania Office of State Planning and Development, 1975.

Schwartzel, Erich. "Will Shale Boom Change Lifestyle of the Amish?" *Pittsburgh Post-Gazette*, Feb 3, 2013. http://www.post-gazette.com/stories/local/region/will-shale-boom-change-lifestyle-of-the-amish-673208/.

Scott, Shaunna L. "What Difference Did It Make?: The Appalachian Land Ownership Study after Twenty-Five Years," *Confronting Ecological Crisis in Appalachia and the South: University and Community Projects*. Edited by Stephanie McSpirit, Lynne Faltraco & Connor Bailey. University Press of Kentucky, 2012.

"Senate Ag Committee Protests Proposed Gas Allocation." *Lancaster Farming,* February 24, 1979.

Sernovitz, Gary. *The Green and the Black: The Complete Story of the Shale Revolution, the Fight over Fracking, and the Future of Energy.* New York: St. Martin's Press, 2016.

"Several Businesses Share in Gas Drilling Study." *Times*, January 4, 1980.

"Sewer Authority Approves Drilling of Four Gas Wells." *Times*, December 10, 1980.

Sheikh, Pervaze A. et al. "Drilling in the Great Lakes: Background and Issues." Library of Congress. Congressional Research Service. Washington D.C., November 11, 2008.

Shoreman-Ouimet, Eleanor. "Concessions and Conservation: A Study of Environmentalism and Anti-environmentalism among Commodity Farmers." *Journal of Ecological Anthropology* 14, no. 1 (January 2010): 52-66.

Smil, Vaclav. *Energy and Civilization: A History.* Massachusetts Institute of Technology Press, 2017.

---. *Energy in World History.* Boulder, Colorado: Westview Press, 1994.

---. *Energy Transitions: History, Requirements, Prospects.* Santa Barbara, CA: Praeger, 2010.

---. *Natural Gas: Fuel for the 21st Century.* West Sussex, UK: John Wiley and Sons, 2015.

"Solons Cautious on Lake Drilling." *Morning News*, December 29, 1980.

Spencer, Saranac Hale. "Energy Company Wins Gas Lease Dispute." *Pittsburgh Post-Gazette*, February 24, 2014.

"Sportsmen Oppose Drilling." *Morning News*, March 12, 1968.

"Sportsmen Preparing for Pollution Board." *Times*, May 15, 1968.

"State Official Says Drilling on Lane Will Be Policed." *Morning News*, April 5, 1968.

Steigerwald, Bill. "27 Families Near Gas Blast Site Evacuated." *Pittsburgh Post-Gazette*, December 30, 1990.

---. "60 Families Near Gas Blast Site Evacuated." *Pittsburgh Post-Gazette*, December 31, 1990.

Stevens, Benjamin H. *Potential Economic and Fiscal Impacts of a Land Use Policy for the Commonwealth of Pennsylvania.* Harrisburg: Pennsylvania Office of State Planning and Development, 1975.

Stone, Ralph W. and Frederick G. Clapp. *Oil and Gas Fields of Greene County, PA*. Department of the Interior, United States Geological Survey, Charles D. Walcott, Director. Washington: Government Printing Office, 1907. Accessed Apr. 4, 2016. http://pubs.usgs.gov/bul/0304/report.pdf.

"Study Identifies Probable Sites for Natural Gas Wells." *Times-News*, August 15, 1981.

Tarr, Joel A., ed. *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region*. University of Pittsburgh Press, 2004.

"The Oil and Gas Law of the Land: Act 13," StateImpact Pennsylvania, National Public Radio Member Stations. Accessed November 17, 2017. https://stateimpact.npr.org/pennsylvania/tag/act-13/.

"There's Gas Down There, Consultant Claims." *Morning News*, May 16, 1980.

Thompson, Jim. "Lamary Quip Angers Erieites," *Erie Times-News*, April 14, 1973.

Tomikel, John C. and Vincent C. Shepps. *The Geology and Geography of Erie County, Pennsylvania.* Pennsylvania Bureau of Topographic and Geological Survey, 1967. https://archive.org/details/geographygeology00tomi.

Trambley, Jerry. "Zoo Director Defends Sale of Gas," *Times-News*, August 5, 1984.

---. "Zoo Director Defends Sale of Gas." *Times-News*, August 5, 1984.

"Tullio Asks Industries to Help in Gas Hunt." *Times,* December 12, 1979.

"Tullio Favors Drilling Gas Wells." *Morning News*, August 10, 1984.

"Tullio Gives 3 Options to Zoo." *Morning News*, August 7, 1984.

"Tullio Proposes Gas Well at Treatment Plant." *Morning News*, December 5, 1980.

"Tullio Proposes Gas Well at Treatment Plant." *Morning News*, December 5, 1980.

"Tullio to Give Council Plan Allowing Limited Gas Drilling." *Times-News*, August 21, 1985.

"Tullio to Give Council Plan Allowing Limited Gas Drilling." *Times-News*, August 21, 1985.

"Tullio urges Council to Allow Zoo, City to Sell Gas." *Morning News*, September 10, 1985.

Tussing, Arlon R. and Connie C. Barlow. *The Natural Gas Industry: Evolution, Structure, and Economics.* Cambridge, Massachusetts: Ballinger Publishing Company, 1984.

Twedt, Steve. "3 In Family 'Critical' After Blast Levels Home." *The Pittsburgh Press*, December 29, 1990.

Udall, Stewart. *The Environmental Debate: A Documentary History*, s.v. DOCUMENT 101: Stewart L. Udall on the Land Ethic (1963), Accessed February 28, 2013. http://www.credoreference.com.pitt.idm.oclc.org/entry/ghed/document_101_stewart_l_udall_on_the_land_ethic_1968.

United States Census Bureau. "Money Income of Households, Families, and Persons in the United States: 1981." Report Number P60-137, March 1983. https://www.census.gov/library/publications/1983/demo/p60-137.html.

United States Department of Agriculture. "Operations with milk cows, by state and region." Economics, Statistics and Market Information System, Dairy Year Book. Accessed March 8, 2014. http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1207.

United States Department of Agriculture. National Agricultural Statistics Service, Agricultural Statistics Board. "February 21, 2018 Milk Production Report." https://release.nass.usda.gov/reports/mkpr0218.pdf.

United States Department of Labor, Wage and Hour Division. "History of Federal Minimum Wage Rates Under the Fair Labor Standards Act, 1938 – 2009." Accessed October 17, 2017. https://www.dol.gov/whd/minwage/chart.htm.

United States Department of the Interior. U. S. Geological Survey Energy Resources Program. "Appalachian Basin Overview." Last modified December 14, 2015. https://energy.usgs.gov/RegionalStudies/AppalachianBasin/TabId/127/PgrID/4391/PageID/2/Default.aspx#377211-overview.

United States Environmental Protection Agency. *Ag101* "Demographics." Updated April 15, 2013. http://www.epa.gov/oecaagct/ag101/demographics.html.

"U.S. Studys [sic] Lake Erie Drilling." *Morning News*, April 2, 1968.

Vaillancourt, Cory. *Lou Tullio: A Real Erie Guy.* Erie, Pennsylvania: Jefferson Educational Society, 2015.

Vallentyne, Peter. "Libertarianism" *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, 2009. http://plato.stanford.edu/archives/sum2009/entries/libertarianism-history/.

Vietor, Richard H. K. *Energy Policy in America Since 1945: A Study of Business-Government Relations.* Cambridge University Press, 1984.

Wagner, Melinda Bollar. "Space and Place, Land and Legacy," ed. Benita Howell, *Culture, Environment, and Conservation in the Appalachian South* (Chicago: University of Illinois Press, 2002).

Waples, David A. *The Natural Gas Industry in Appalachia: A History from the First Discovery to the Maturity of the Industry.* Jefferson, North Carolina: McFarland, 2005.

Watson, Wyndle. "No Wilderness: All's (About Oil) Wells Along the Allegheny Front." *Pittsburgh Press*, November 22, 1983.

Wellejus, Edward. *Erie: Chronicle of a Great Lakes City*. Windsor Publications, 1980.

Wesman, Gary. "Can Shallow Wells Fuel Industry?" *Morning News*, January 16, 1981.

---. "Erie Goes to Court to Halt Gas Well Drilling." *Morning News*, April 11, 1985.

---. "Fumes Choke Erie After Drillers Hit 'Bonanza' at Tech Gas Well." *Morning News*, March 26, 1981.

---. "Gas Drilling Study – Wise or Waste?" *Morning News*, January 15, 1981.

White, Courtney. "The Working Wilderness: A Call for a Land Health Movement." *The Way of Ignorance*. Edited by Wendell Berry. Berkeley, CA: Counterpoint Press, 2005.

Wilber, Tom. *Under the Surface: Fracking, Fortunes, and the Fate of the Marcellus Shale.* Cornell University Press, 2012.

Williams, John Alexander. *Appalachia: A History.* Chapel Hill: University of North Carolina Press, 2002.

Williams, Michael Ann. "'When I Can Read My Title Clear': Anti-Environmentalism and Sense of Place in the Great Smokey Mountains," ed. Benita Howell, *Culture, Environment, and Conservation in the Appalachian South.* Chicago: University of Illinois Press, 2002.

"Workers Start Sealing Well Tied to Home Blast." *Pittsburgh Post-Gazette*, Jan. 5, 1991.

Worster, Donald. *Nature's Economy: A History of Ecological Ideas*, 2nd edition. Cambridge University Press, 1994.

Writers' Program of the Works Progress Administration in the Commonwealth of Pennsylvania. *Story of Old Allegheny City.* Pittsburgh: Allegheny Centennial Committee, 1941. http://digital.library.pitt.edu/cgi-bin/t/text/text-idx?idno=00ace7952m;view=toc;c=pitttext.

Zelinsky, Wilbur. *The Cultural Geography of the United States.* Englewood Cliffs, New Jersey: Prentice Hall, 1973.

Zona, Tony. "City Zoning Law Gets the Old One-Two Punch." *Erie Daily Times*, April 4, 1985.

"Zoo Gas Well Shut Off." *Times-News*, August 18, 1984.

"Zoo Shuts Off Gas Well." *Morning News*, August 21, 1984.

Zurn Industries, LLC. Official Website, updated 2017. www.zurn.com.

Interviews

Delassio, Sam, January 10, 2018.

Kubiak, Dick, January 16, 2018.

Long, Louise, August 5, 1986. Lupo,

Sr. Patricia, January 15, 2018.

Mattilio, John, April 25, 2016.

Tarr, Joel A., March 5, 2013.

Wesman, Gary, January 17, 2018.