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Carleton University

**Redefining the Public Interest in Rural Alberta:
Health, Environment, and Economics in the Heartland of the Oil and Gas
Industry**

**A thesis submitted to
The Faculty of Graduate Studies and Research
in partial fulfillment of
the requirements for the degree of
Master of Arts**

Institute of Political Economy

**by
Colin Lund**

Ottawa, Ontario

September, 2001

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**Redefining the Public Interest in Rural Alberta: Health, Environment, and
Economics in the Heartland of the Oil and Gas Industry**

submitted by Colin Curtis Lund
in partial fulfilment of the requirements for
the degree of Master of Arts

Thesis Supervisor

Director, Institute of Political Economy

Carleton University
September 2001

Abstract

Rural residents in Alberta face many difficulties when they attempt to resolve disputes arising from the practices of oil and gas companies. These difficulties emerge from the common notion that the petroleum industry is a main contributor to the public interest in the province. Building on conceptions of prairie populism formulated in Canadian political economy, this study argues that the form of populism advocated by politically conservative governments in Alberta has served to protect the interests of the petroleum industry. By drawing on conceptions of resource dependency and citizen activism developed by resource and medical sociologists, rural residents' efforts to address the health and environmental effects of oil and gas production are analyzed. An application of sociological theories of resource dependency and citizen appropriation of expert knowledge exposes how recent efforts by rural activists to address the impacts of petroleum production are contributing to redefinitions of public interest and populism in rural Alberta.

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1. Introduction

If we're going to become sacrifices of the production of fossil fuels, then the rest of the world should know it and they should be accountable for us, because we exist.

—Rose Balcom, founder of Survivors of Sour Gas (October 15, 2000).

On August 24, 2001, the following intriguing headline appeared on the front page of the *Globe and Mail*: “PM’s talk infuriates Albertans.” The story was in response to a speech Jean Chrétien had delivered to a business audience the previous morning, in which he urged Alberta to share its “eye-popping wealth” with other parts of Canada, in order to help solve the country’s social problems. But in Alberta’s political environment, the expression of such sentiments was perilous indeed, and municipal and provincial politicians clamored to remind the public of Pierre Trudeau’s National Energy Policy (NEP), which was implemented in the early 1980s and was, according to legend, responsible for the loss of untold amounts of resource wealth for the residents of the province (Chase and Scoffield Aug 22, 2001). Two days earlier, the *Globe and Mail* ran a story about the efforts of the Alberta government, in conjunction with the province’s oil and gas industry, to lobby Ottawa to seek credits for the export of both natural gas and crude oil under the rules of the Kyoto agreement (McCarthy and Mahoney Aug 24, 2001). Their argument was that natural gas and crude oil are clean forms of energy, and that Canada should be rewarded for extracting and subsequently exporting them to other countries.

These news stories are interesting because they capture two essential myths ingrained in the political culture of Alberta: first, that Central Canada is the primary culprit responsible for the siphoning off of the resource wealth to which each citizen of the province is entitled; and second, that the extraction and processing of oil and gas in Alberta is a purely positive endeavor which could not have any harmful ramifications. The national media has a tendency to presume that these sentiments are shared by all Albertans. However, the opening quote by Rose Balcom — founder of Survivors of Sour Gas, a victims' group for those suffering from the impacts of sour gas production (sour gas is natural gas containing hydrogen sulphide) — suggests that at least some Albertans do not believe that the province's oil and gas industry has an unequivocally positive influence. The struggles of increasing numbers of rural Albertans — those who bear the brunt of the apparently invisible environmental and health costs of petroleum production — to address the practices and impacts of the oil and gas industry is the focus of this study.

The public interest in Alberta has traditionally been defined by the politicians, the business class and, to a more limited extent, the media. It has been defined as synonymous with the extraction, processing, and delivery of energy resources. However, efforts by rural residents to address the environmental and health impacts of oil and gas production have called this definition into question. These residents are, in fact, contributing to a broader conceptualization of public interest by emphasizing the importance not only of economic development, but also of clean environments, human and animal

health, and public safety. It is my goal in this project to identify and analyze the challenges implicit to a redefinition of the public interest in Alberta. this redefinition encompasses not only the economic considerations of resource industries, but also respects the economic, health and environmental concerns of rural Albertans who are affected by the petroleum industry.

I argue that the difficulties that need to be confronted in redefining the public interest in Alberta stem from the profound extent to which the social, political, and economic environments in the province are influenced by economic development based on petroleum production. The dominant conception of public interest in the province is shaped largely by an awareness of the importance of wealth creation through resource development, and this has overshadowed recognition of the damaging effects of extraction, processing and delivery of oil and gas. Moreover, due to the province's resource dependency, conservative politicians, much of the business class, and many other residents fear the economic implications of criticizing or challenging the practices of oil and gas companies. Those who do confront such fears and take action to address the impacts of oil and gas production face further obstacles from unsympathetic provincial and local politicians. The regulatory bodies' emphasis on promoting resource development, rather than the protection of human and environmental health, further reduces the capacity of rural residents to change the practices of petroleum producers. I contend that oil and gas development has shaped commonly held perceptions in the province about the legitimacy and effects of criticizing petroleum companies. I believe that it has also affected the political

culture, including regulatory institutions, in ways that diminish the likelihood and the extent to which public interest can be redefined.

Defining Public Interest in Alberta: A Brief Conceptual History

The conceptualization of public interest in Alberta has been shaped by the unique juxtaposition of the province's geographical isolation and its political and economic alienation from Central Canada up until the mid-twentieth century, together with its remarkable endowment of valuable natural resources. Alberta's distance from markets and its relatively small population have made economic diversification a formidable task. However, since the discovery of vast quantities of crude oil in 1947, the province has experienced a considerable degree of economic prosperity. Petroleum resources and the conceptualization of public interest are thus inextricably intertwined in Alberta. This has fostered a commonly held perception in the province that oil and gas activity is unquestionably in the public interest. Such a conception of public interest means that the perceived economic benefits of oil and gas activity overshadow other economic sectors such as agriculture and forestry, alternative energy industries such as wind farming or manufacturing, or service industries not directly related to petroleum production. This petroleum-influenced perception of public interest has also accentuated the difficulty of resolving economic and health problems related to oil and gas activity.

During the first half of the twentieth century, economically marginalized farmers on the prairies developed a deep resentment against Central Canadian

economic elites and politicians. Prairie populism emphasized the notion that Central Canada was the primary obstacle preventing prairie residents from experiencing full benefits from development of the region's resources (Richards and Pratt 1979, pp.14-42). In Alberta, this distrust of Central Canada has remained central to populism as formulated and expressed by members of the business class and by politically conservative provincial governments (which have been the only governments in the province since the Social Credit party was elected in 1935). The long-term economic implications of allowing large oil and gas companies (many of them foreign-owned) to extract and market non-renewable resources has thus been almost entirely excluded from political discourse in the province. Moreover, the environmental impact of oil and gas activity, along with its effects on human and environmental health, have been generally overlooked by provincial politicians because such subjects are not of central importance to the popular conceptualization of public interest. It therefore appears that populism has evolved to act as a constraint upon efforts to resolve the environmental, health and economic problems stemming from petroleum production. This is because the province's economic and political establishment does not perceive oil and gas companies to be a threat to the public interest.

Alberta gained control of its resources from the federal government in 1930, and now owns most of the province's mineral resources, with a small minority of landowners possessing the subsurface rights to mineral resources underneath their lands. This ownership of mineral resources grants the province the right to collect royalties (a royalty is a payment to the owner of a non-

renewable resource for its extraction) from companies that lease mineral rights from it (Griffiths 2001, p.3; Macnab et al. 1999, pp.3-4). Consequently, the provincial government derives a considerable amount of revenue from its ownership of mineral resources. This has allowed provincial governments to maintain the various costs of governing, including the expense of providing essential services along with the provision of social programs. Because they collect royalty rates, provincial governments in Alberta have also established a tradition of levying low provincial taxes, and no provincial sales tax. Possession of most of the province's subsurface mineral rights has provided considerable incentive for the conservative political class in Alberta to equate the public interest with expansion of the oil and gas industry.

Social Credit and Progressive Conservative governments in Alberta have consistently equated public interest with economic growth through resource extraction and processing. Historically, however, there have been variations in the extent to which serving the public good has entered into the practices of provincial governments. The Social Credit party under William Aberhart was initially attentive to the distrust felt by its populist constituency towards large economic interests. However, Aberhart and his successor Ernest Manning were keenly aware of the significance of oil and gas resources to the province's economic development. They therefore created policies to facilitate the orientation of populism in the province away from the notion of protecting economically vulnerable rural residents and toward dominant economic interests (Richards and Pratt 1999, pp.57-58).

The Progressive Conservative Party under the leadership of Peter Lougheed did much to ingrain the notion in Alberta's political culture that Central Canada possessed neo-colonial tendencies in its relations with the province. This resulted primarily from Lougheed's efforts to address Ottawa's energy policies during the 1970s and early 1980s (Richards and Pratt 1979, pp.148-159).

Lougheed's government did not establish an equally notable reputation for addressing the negative implications of petroleum production. However, it did expect the oil and gas industry to contribute to the public interest in ways that transcended the mere pursuit of corporate profits. It thus collected royalties from oil and gas companies at rates, which allowed it to invest rather generously in social programs such as health, education, and the creation of public recreational facilities and parks. The Lougheed government also created the Heritage Trust Fund, derived from petroleum revenues, which is used for various public-spending initiatives. Most importantly, the Heritage Fund is earmarked for use by future generations of Albertans during economic downturns or when oil and gas resources are depleted. Hence, public interest during the Lougheed era, though strongly influenced by petroleum production, was informed by a conception of the importance of the provision of public goods and services. To this extent it was shaped by a social democratic orientation more common to the national and international political environment of the 1950s to 1970s than that of the 1980s and 1990s.

In 1992, the election of the Conservative Party under the leadership of Ralph Klein witnessed the emergence of a neo-liberal conceptualization of public

interest at the political level in Alberta. Under the Klein administration, social spending has been cut dramatically, causing the province's health and education systems to suffer from chronic underfunding. Funding to the Alberta Energy and Utilities Board (EUB) and to Alberta Environment, the chief regulatory bodies surrounding the oil and gas industry, has also been slashed. This has, in effect, resulted in deregulation of the oil and gas industry. Such changes have occurred at a time when the provincial government has dramatically reduced the rate at which it collects royalties from oil and gas companies (Macnab et al. 1999, pp.3-4). It is evident that the deregulatory, small government emphasis of neo-liberal economics, which has become a global hegemonic force since the 1980s, has firmly taken root in the province. In Alberta this has led to a new stage in the relationship between petroleum production and the defining of public interest. It now appears that, for the provincial government, enhancement of oil and gas companies' profit margins has become the primary criterion in defining the public interest.

The deregulation of the oil and gas industry during the 1990s, a period of considerable industry expansion, has fostered an environment in which increasing numbers of rural Albertans are undertaking a broader conceptualization of public interest. Expansion of the oil and gas industry into populated agricultural regions has accentuated the economic and health impacts of petroleum production. The limited capacity of the province's regulatory agencies to reduce industry impacts has forced individual citizens to take a more active role in identifying and attempting to resolve environmental problems

stemming from petroleum production. In their struggles with oil and gas companies, concerned rural residents stress the importance of reducing environmental contamination, and of protecting and enhancing human and animal health. They are thus contributing to a definition of the public interest that is similar in orientation to the early populist emphasis on defending the interests of poor farmers against economic and political elites. In this respect, the conception of public interest being developed by these rural residents stands in stark contrast to the definition adhered to by Conservative politicians and the province's business class.

Theoretical Framework

I will utilize a wide range of theories in order to explain how the social, political and economic context in Alberta shapes environmental and health issues arising from the oil and gas industry. The complexity of the subject matter addressed in this thesis necessitates a borrowing of theoretical insights from a number of academic disciplines and sub-disciplines. Consequently, I will bring together concepts from Canadian political economy, rural and resource sociology, and medical sociology, in order to interpret the social forces shaping environmental conflicts surrounding Alberta's petroleum industry.

Conceptions of public interest in Alberta have been shaped profoundly by the historical evolution of populism. I draw on Larry Pratt's and John Richards' classic Canadian political economic study of capitalist development in Alberta and Saskatchewan in order to provide an understanding of the historical

relationship between populism and politics (Richards and Pratt 1979). Building on Pratt's and Richards' work, I will explain how populism in Alberta was diverted away from protecting the interests of economically and politically alienated farmers and towards the protection of the interests of the oil and gas industry.

Rural residents who attempt to promote the public interest and to address the impacts of oil and gas activity face constraining factors within the social context of resource-dependent communities. Resource sociologist William Freudenberg identifies a common tendency among politicians, business leaders, and workers within rural communities to become addicted to economic development based on resource extraction industries (Freudenberg 1992). Freudenberg's analysis is therefore particularly well suited to the identification of political and economic constraints operating within oilpatch communities, which citizen activists must attempt to overcome in their struggles. Politicians, chambers of commerce, and resident workers in oilpatch communities often perceive the actions of those seeking to resolve health or environmental issues related to the petroleum industry as threats to their own and their communities' economic security. Freudenberg's insight into the socially corrosive struggles that can surround environmental issues in such contexts provides further theoretical depth to my analysis of this situation (Freudenberg 1997).

Chronic exposure to industry emissions from practices such as the flaring or venting of hydro-carbon compounds into the atmosphere are not experienced uniformly by residents throughout communities, causing some (less affected) residents to doubt that environmental problems exist. This creates frustration and

a sense of abandonment among residents who seek to address situations in which they've already been left feeling forsaken by authorities, former friends and acquaintances. Couch and Kroll-Smith offer an important understanding into the socially destructive characteristics of environmental disputes surrounding long-term exposure to industrial contamination. Their important theoretical insights into the social dynamics of exposure disputes provide conceptual guidance for my analysis of social divisions which often form in oilpatch communities affected by environmental controversies (Couch and Kroll-Smith 1994).

The many challenges and sources of intimidation stemming from environmental issues in rural Alberta are increasingly being confronted by residents unwilling to accept the environmental, health and economic impacts of oil and gas activity. Discussion of some of the approaches taken by those addressing environmental and health problems in oilpatch communities will be provided in chapter eight. In this section I will discuss how concerned residents in the Turner Valley region of Southern Alberta have identified and raised awareness of a Multiple Sclerosis (MS) cluster in the area that they believe may be related to past and present oil and gas activity. Medical sociologist Phil Brown's concept "popular epidemiology," which he has developed to explain epidemiological research undertaken by lay activists into the health impacts of industrial contamination, will inform this analysis (Brown and Mikkelsen 1990; Brown 1992, 1997). Similarly, some activists in rural Alberta are shaping the way that the EUB hands down decisions in public hearings by gaining expert knowledge of industry practices such as flaring, waste disposal, the construction,

operation and maintenance of pipeline systems and the potential health, environmental and economic impacts of these activities. Couch and Kroll-Smith's conceptualization of how environmental activists fuse expert knowledge with appeals to citizens' rights to clean and safe environments will help illustrate how such actions represents a reappropriation of populism by concerned rural residents (Couch and Kroll-Smith 1997).

Broadening the Theoretical Framework: Introducing Political Economy to Sociology

My analysis is influenced strongly by theories from resource sociologists because these are particularly valuable in their identification of the political and economic attributes of resource dependent communities. Such theories hold considerable explanatory power in assessing how the socio-economic and political environments of resource communities shape environmental disputes. They are also very helpful in identifying the difficulties inherent in redefining conceptions of public interest in communities so profoundly shaped by a specific resource sector such as oil and gas. Theories of citizen activism formulated by medical sociologists are also powerful analytical tools in conceptualizing the actions of activists aiming to address the health impacts of industrial activities. Hence, by applying theories of resource dependency, exposure disputes in rural communities, citizen utilization of expert knowledge and popular epidemiology borrowed from resource and medical sociology, I aim to address the complexity

of environmental and health disputes surrounding the oil and gas industry in Alberta.

The application of these various sociological theories to a political economic analysis of environmental disputes surrounding Alberta's oil and gas industry is rather uncommon. Theories of resource dependency have been formulated largely in relation to the mining industry, while there has been some emphasis on energy. Most notable in the latter field is William Freudenberg and Robert Gramling's comparative study of environmental issues surrounding the offshore oil industry in Louisiana and Northern California (Freudenberg and Gramling 1994). Theoretical conceptions of exposure versus toxic waste disputes formulated by Stephen Couch and Steve Kroll-Smith have addressed the mining and toxic waste industries. Couch and Kroll-Smith's analysis of expert knowledge addresses a variety of environmental issues with an emphasis on toxic waste disputes (Couch and Kroll-Smith 1997). Similarly, Phil Brown and Edwin Mikkelsen have focused their conceptualizing of popular epidemiology on toxic waste disputes in the community of Woburn, Massachusetts, and to a lesser extent in Love Canal in upstate New York (Brown and Mikkelsen 1990). By fusing these theories with a political economic analysis of Alberta's oil and gas industry, I hope to illuminate the specific characteristics of environmental disputes surrounding petroleum production, specifically in the socioeconomic and political context of Alberta. In this way, I aim to make an original and insightful contribution to the literatures of resource and medical sociology, along with scholarship in the realm of political economy.

Canadian political economy can be enriched by focusing more analytical attention on environmental and health issues surrounding resource extraction and processing industries. Political economy has not engaged vigorously in analyses of environmental disputes in resource communities. By applying theories formulated by resource and medical sociologists, I can effectively analyze how environmental and health issues are contested at the local level in oilpatch communities. My analysis of citizen activism in such communities is given further explanatory scope by combining observations of political and economic developments in Alberta with discussion of the evolution of conceptions of public interest. This allows me to point out how traditional conceptions of public interest are being renegotiated and reformulated by concerned rural residents and to expose the narrowness of the traditional conception of public interest in the province.

I place a strong emphasis on substantive discussions of petroleum industry practices and their regulation in Alberta. This is necessary in order to explain how oil and gas activity, which is defined as central to the public interest by Alberta's politicians and business community, has negatively impacted rural environments and thus created the incentive for a redefinition of public interest. This effort also creates the opportunity to provide an important description of the profound environmental, economic and health impacts of petroleum production. I hope that this will further enrich and broaden academic discussions of the energy industry and its specific effects on the social political and economic context of Alberta.

My research integrates a qualitative social scientific framework into the study of the practices of the petroleum industry (please see Appendix A for details on methodology). The latter is an area that has traditionally been the preserve of technology-oriented engineering analyses, natural scientific studies of environmental impact, and public policy observations of government bureaucracies and regulatory authorities. Such disciplines generally overlook rural residents, who are arguably those most impacted by the activities of the oil and gas industry. In conducting my studies through the social sciences, there is perhaps greater potential to bridge the gap between academic analyses and the efforts made by rural residents to address environmental and health issues related to petroleum production. By emphasizing the interaction between rural residents, industry and government regulatory bodies, my aim is to communicate insights relevant to a broad range of social actors.

2. A History of the Alberta Petroleum Industry

Introduction

The early discovery of petroleum resources in Alberta created a great deal of excitement and speculation stemming from a strong perception of the potential economic benefits which exploitation of such resources could contribute to the province. This was fueled by a number of significant resource finds such as the discovery of natural gas at Bow Island in 1909 and the development of oil and gas reserves in Turner Valley beginning in the 1920s. Despite these developments oil and gas failed during these years to lift the province out of status, shared by Saskatchewan and Manitoba, as an agricultural producer. The discovery of petroleum resources did, however, produce an insatiable desire to explore and exploit the riches that potentially rested underneath the province's soil. This drive to discover and exploit oil and gas resources occurred in an era when regulation of the industry was virtually non-existent. Consequently a remarkable waste of resources ensued which eventually became too difficult for both politicians and members of industry to perceive as being in the public interest. This led to the development during the late 1930s of regulations governing the practices of the emerging oil and gas industry. However, the movement toward regulation was driven by the economic need to reduce waste of resources. Thus regulation developed according to the economic imperative of promoting sound development of resources rather than to prevent destruction of environments, inappropriate disposal of hydro-carbon pollution, or to protect human and animal health. The fact that these considerations did not influence

the conception of public interest which informed the early regulation of oil and gas activity is quite astonishing considering the impacts of the industry practices which are discussed below.

2A. From the beginning until 1947

During the 1930s and early 1940s, international oil companies conducted exploration efforts in various regions of Alberta in the hopes of replacing the dwindling reserves of the Turner Valley field, which lies south-west of Calgary. In 1946, Imperial Oil decided to undertake one last drilling program across the province from east to west, after having drilled 133 dry exploratory wells in Alberta and Saskatchewan. The first drill site was in a field on the farm of Mike Turta, just west of Leduc, a small Ukrainian community about 50 kilometres south of Edmonton. Drilling started on Nov 20, 1946, and shortly thereafter oil flowed to the surface in a drill stem test. On February 13, 1947, in the presence of invited dignitaries, Leduc #1 began to spew 155 cubic metres per day out of Leduc's 200 million-barrel oil field. This is the seminal symbolic event in the evolution of Alberta's identity as a modern "have province" where the streets are apparently paved with black gold (McKenzie-Brown 1984, p.7).

The Origins of an Industry

Alberta's petroleum industry had actually begun much earlier, and had already exposed the province's population both to the lure of resource prosperity

and to the potential social, economic and environmental pitfalls that are typically fostered by rapid expansion in the oil and gas sector. A Cree guide named Wa-Pa-Su, who was employed by the Hudson's Bay Company, provided the earliest written record of fossil fuels in the province in 1719. In his notes, he describes a seeping black gunk in the region of the Athabasca Tar- Sands which natives in the area used to waterproof their canoes (Conrad 1999, p. 93). Then, in 1778, the explorer Peter Pond recorded his finding of a portion of the tar-sands geological formation at the confluence of the Athabasca and Clearwater Rivers (Geo-Help 2001 p.1). In 1886, shortly after George Kootenai Brown found an oil seep on the banks of a creek in the location of present-day Waterton Park, a small oil boom led to the brief erection of an oil city. One of the wells operated by the Western Oil Company blew out of control, polluting Waterton Lakes and killing a significant population of fish and waterfowl (Stenson 1985, p. 5; Conrad 1999, p. 94). Crude oil was not discovered again in the province until the 1930s.

Natural gas, however, was already being exploited in the late 19th century as a cheap source of energy in southern Alberta. The first discovery of natural gas in western Canada occurred in 1883 at a railroad siding called Langevin, just west of Medicine Hat, when CPR crews drilling for water smashed through the bedrock and hit gas at 1155 feet. A second well at an identical depth yielded similar results. The Langevin findings encouraged geologist George M. Dawson to predict, in a paper submitted to the Royal Society of Canada in 1886, that since such rock formations in which the drilling occurred were common to much of western Canada, the region would soon produce large quantities of natural

gas. He further commented that such an outcome would be of notable economic importance to the west (Stenson 1985, p.4).

These observations emboldened enterprising residents of Medicine Hat to drill right underneath the town after the CPR found gas across the river in 1890. Successful drilling efforts within the city allowed it to set up a system of gaslights on its railway platforms and street corners, which put the town in the headlines of Ripley's "Believe it or Not." In 1907, Medicine Hat's notoriety was further established, if in a slightly less gratifying way, when Rudyard Kipling visited the city. Viewing its flaming gas flares and 24-hour street lamps — it being cheaper to keep them burning than to hire a lamplighter — he remarked that Medicine Hat had "all Hell for a basement." (Stenson 1985, p. 6). The focus of oil and gas exploration was to shift to other locations in the province during the coming decades, but the pattern of immediate profit-driven waste and seeming indifference to health, environmental, and aesthetic concerns would continue to inspire diabolical-sounding metaphors to describe the effects of industry development.

One year prior to the Langevin find, renowned geologist Robert Bell led an expedition that included George Dawson into the Athabasca basin in northern Alberta. This expedition was to investigate the oilsands, and Bell concluded that they were located above a vast reservoir of petroleum. During the mid-1890s, the Dominion government undertook a drilling program in the northern half of the province in order to discern the region's resource potential. In 1897, contractor A.W. Fraser struck gas at Pelican Rapids, stimulating a flaming well blowout that

continued to roar in the northern wilderness for 21 years before being capped. The isolation of the north provided justification for not developing the well commercially and — in conjunction with an absence of petroleum conservation and environmental protection legislation — for not plugging it. The remoteness of the north also served to focus exploration and drilling activity in the south, thus perpetuating for many decades speculation amongst geologists about a possible northern petroleum Eldorado (McKenzie-Brown 1984, p.3; Breen 1993, p.8).

Growth of an Industry: The Beginnings of External Investment

The finding that finally initiated the development of a western Canadian gas industry was the 1909 Bow Island discovery southwest of Medicine Hat. Eugene Coste's *Old Glory* strike was large enough to inspire the Paris-educated geologist to undertake one of the more significant industrial projects of the time: a pipeline equipped to transport gas from Bow Island to Calgary, while linking the towns of Lethbridge, Nanton and Okotoks to the system. Coste, who was originally from Ontario, overcame the difficulty of financing such a project by luring investment from a consortium of British and eastern Canadian economic interests. By doing so, he was beginning what eventually became an established pattern of courting outside involvement in the development of Alberta's natural resource sector. Coste also gained crucial public support for the newly incorporated Canadian Western Natural Gas, Light, Heat and Power Company, through a process of showmanship that included highly popular flare-lighting

ceremonies, which proved to be exceptional crowd-pleasers in Calgary and Lethbridge (Breen 1993, p. 13-15; Stenson, p. 14).

Turner Valley: A Period of Discovery

The novelty of witnessing burning gas-flares presumably wore off for residents of Calgary and much of the rest of southern Alberta during the development of the Turner Valley field. The first of three oil and gas booms in the Valley occurred in 1914. Despite excessive speculation and initial investment— exemplified by the formation of more than 500 oil companies on the Calgary stock exchange in a 24-hour period—the first Turner Valley boom was notable mainly for relieving investors of their savings. However, this situation changed quite dramatically with the second major discovery, in 1924, at the Royalite #4 well. Fred Stenson, in his colourful and exceedingly enthusiastic history of Canada's gas industry, *Waste to Wealth*, underscores the significance of Royalite #4:

The discovery of wet gas at Turner Valley, in Limestone of Devonian age, was an event of tremendous importance to Western Canada. In a sense, it was like the discovery of a new continent suitable for colonization. Suddenly, a vast new territory existed for oil and gas men to move into with their rigs and what discoveries they would make along that new horizon! (Stenson 1985, p. 34)

Royalite #4 ushered in an era of discovery, but some of the findings were quite negative. Along with the discovery of vast energy resources, there were also discoveries of the waste that can occur in a rapidly expanding, unregulated oil and gas industry, the fast pace at which foreign-owned oil companies can gain

control over an emerging petroleum producing region, and the human and ecological dangers of sour-gas extraction and processing. On October 14, 1924, drilling crews for Royalite, a Canadian subsidiary of the American Rockefeller-owned Imperial Oil, decided to send their drill bit down as deep as 3470 feet, considerably deeper than any previous drilling effort. At that point, wet gas — with a significant concentration of hydrogen sulphide— began to surge to the surface at a flow of 21 million cubic feet a day. Four days later, on October 18th, the crew attempted to shut the well in by clamping a valve on it. Very rapidly, the pressure built up to dangerously high levels, sending the workers running for their lives. The well soon caught fire and continued to burn for three weeks, during which time residents in a wide swath of southern Alberta, including Lethbridge at 150 kilometres away, had the opportunity to witness the glow of Alberta's first sour-gas well blowout. It took experts from Oklahoma another two months to finally get the well under control (McKenzie-Brown 1993, p.16; Stenson 1985, p.34).

The fireworks did not end with the capping of Royalite #4. The years between 1924 and 1938 witnessed the era of “Hell’s half-acre” in Turner Valley, when an infamous ravine in the area acted as a large pit-flare (an earthen pit in which operators burn the excess gas that is extracted while drilling) for Imperial and the numerous independent companies operating in the valley. The flares burned day and night during these years, contributing to significant localized climate change that brought about the advent of year-round green grass, and lured wildlife to the area, including migratory birds who decided to winter there. A

Manchester journalist who visited the region at the time famously described the region in these cataclysmic terms:

...Seeing it you can imagine what Dante's inferno is like... a rushing torrent of flame, shooting 40 feet high... a ruddy glow to be seen for 50 miles... most awe-inspiring spectacle... men have seen the hosts of hell rising ... the titanic monster glowering from the depths of Hades...(McKenzie-Brown 1984, p.5)

Although the flares could be viewed as far away as Lethbridge and Pincher Creek, legend has it that residents of Calgary, at 50 kilometres away, could read their paper outside on summer nights and no longer needed a street lighting system (Richards and Pratt 1979, p. 46-47; Stenson 1985, p.39).

Early Gas Processing and Pollution

In 1925, Royalite's #4 well exceeded the combined production of all other Canadian gas wells by thousands of barrels. However, in order to market the gas, the toxic and odorous hydrogen sulphide needed to be extracted first (Breen 1993, p.47). Consequently, Imperial Oil constructed a scrubbing plant in the valley where the hydrogen sulphide could be removed before the marketable natural gas could be sent via pipeline to Calgary. The Turner Valley gas processing plant was the first to remove hydrogen sulphide in the province and one of the earliest to do so in the history of the petroleum industry. The separated hydrogen sulphide was either vented or flared into the atmosphere. The crude technology used in the plant simply diluted the poisonous gas and then disposed of it by dispersing it in the air through two tall stacks. One of the greatest shortcomings of this method stemmed from the fact that hydrogen

sulphide is heavier than air, so after being dispersed a bit, the gas simply settled to the valley floor (McKenzie-Brown 1993, p.29). Along with killing at least two workers at the gas plant, this process sent foul-smelling emissions throughout the valley and incited numerous health-related complaints from residents. One of the more intriguing effects recorded by doctors at the time was the tendency of patients who had been exposed to hydrogen sulphide to become immune to medical anesthesia (Stenson 1985, pp. 35-36)¹.

Early residents of Turner Valley experienced regular exposure to significant amounts of hydrogen sulphide until a sulphur recovery plant was built northwest of the valley at Jumping Pound in 1952. The situation for valley residents was further eased later that same year, when the newly built Madison Gas Plant began extracting sulphur from gas right in Turner Valley. By that time, new discoveries of sour gas in the southern Alberta foothills, along with expanding markets for elemental sulphur (a byproduct of sour gas processing used in the production of fertilizer, paper, pharmaceuticals and other products) increased the incentive for utilizing sulphur recovery methods (Petroleum Communication Foundation (2001). *Sour Gas: Questions and Answers*. pp.28–29).

¹ Unfortunately, no epidemiological studies were conducted in the valley during the years of maximum flaring and operation of the gas processing plant; these could have provided valuable information on the type, extent, and distribution of health problems related to industry practices in those days. Yet, as will be discussed in greater detail later, there are today irregular patterns of health problems, such as an extremely high incidence of multiple sclerosis (MS), affecting the population presently residing in Turner Valley. Some of the valley's residents believe that these health problems may be traceable to industry activities in the first half of the 20th century. These unresolved concerns are causing some inhabitants of the valley to express their frustration with the apparent indifference of the EUB and the provincial government. The current concern and confusion about the source of health complications experienced by numerous residents in the valley indicates a continued need for epidemiological studies of the area.

Competition, Waste, and the Need for Regulation

Another of Turner Valley's significant historical distinctions was its remarkable demonstration of the extent to which waste can occur in an unregulated oil and gas-producing region. For in the case of Turner Valley, the operators involved were not only avoiding channeling resources toward efforts aimed at minimizing the potential health and environmental impacts of their activities, they were also simply flaring off vast quantities of the natural gas they possessed out of a perceived immediate lack of profit incentive to do otherwise. Contributing significantly to wasteful practices in the valley was Royalite's hegemonic position among producers. It had an exclusive contract with Calgary's gas monopoly, Canadian Western Natural Gas, and it also possessed the only pipeline to the city. Because of Turner Valley's isolation and a lack of pipelines to other major population centres, the producers in the area — with the significant exception of Royalite — did not have a market for the natural gas that they extracted. However, the naphtha (a light and viscous, straw-coloured liquid known commonly in Southern Alberta at the time as "skunk gasoline") that was found with the natural gas was used in the area as a form of gasoline for motor vehicles and tractors. Consequently, the independent producers extracted the marketable naphtha and then simply flared off the unmarketable natural gas. During the warmer summer months, Royalite also flared off considerable amounts of natural gas that was not been being used by residential customers in Calgary (Stenson 1985, p.39; McKenzie-Brown 1993, pp.16-17).

Other factors located in the regulatory environment and precedents established in the development of petroleum resources in the United States fueled the extravagant waste by Turner Valley's producers. Key among these was the reality that mineral resources were developed through a process of divided ownership, which encouraged competitive and overzealous extraction. Secondly, in North America the rule of capture has usually held sway in the courts. This means that those who gain possession of a resource establish ownership over it, so any operator who has secured a surface lease and has undertaken drilling efforts gains possession of the oil and gas once it has been extracted. Since oil and gas are fugacious substances — that is, they flow to the surface wherever they can be released — it is in the interest of operators in a competitive environment to extract as much of the resource as possible before other producers on neighbouring lands, who have access to the same petroleum pool, can deplete the full field or reservoir. Without some sort of regulatory apparatus to control the development of petroleum reserves, competition between producers increases the depletion of the resource because operators scramble to recover as much of the petroleum reservoir as possible before someone else does (Richards and Pratt 1979, pp.46-53).

Among the factors that complicated this situation during the early development of the petroleum industry in North America was the obvious fact that maximum efficiency of production would be fostered in a non-competitive environment. If a single operator obtained sole-ownership of a reservoir there would presumably be no reason to extract resources until there was an adequate

market for them. However, the petroleum-producing regions of North America, such as Texas, Oklahoma, California and Alberta, have fostered a strong adherence to ideas of competitive individualism and free-market capitalism. In conjunction with such notions, there has existed an equally strong distrust of government, particularly of the implementation of government regulations, which can be perceived to restrict people's social and economic freedoms (see chapter 3. on populism). Moreover, the implementation of regulatory standards have historically been viewed by smaller operators as imposing measures that benefit the large producers by legitimizing their control of the petroleum sector. This is an understandable assumption, since Imperial Oil was able to establish a dominant position in Turner Valley through its monopoly arrangement with Canadian Western Natural Gas — thus allowing it to limit wasteful gas emissions — and because its financial strength gave it the capacity to construct pipelines and gas processing plants. Moreover, production cuts hit smaller producers harder as a result of their relative inability to defer monthly income, upon which they are more dependent than were the major companies with their much larger operating budgets (McKenzie-Brown 1993, p.70). For these reasons, there has historically been considerable opposition in North American oil producing regions to efforts made by governments to regulate oil and gas operators (Richards and Pratt 1979, pp. 47-55).

It is quite apparent that the effective implementation of conservation measures is beneficial in the long term to the oil and gas industry, and is ultimately in the public interest in petroleum producing locales. Yet in the early

years in the United States and in Turner Valley, oil and gas companies were incapable of establishing a working agreement on conservation standards. Thus, in 1932, when in response to revelations of excessive depletion of gas reserves, the UFA attempted to control the prevailing anarchy by passing the Turner Valley Conservation Act, many independent producers put up resistance. This act established the Turner Valley Conservation Board, which proposed production quotas and the working out of a scheme for effective and ordered management of the reservoir. However, many of the independent producers were suspicious that the Board would act as an advocate for the major companies. One of the independent producers appealed the legislation to the Supreme Court where it was declared *ultra vires* (unconstitutional) and the Board was subsequently disbanded (Breen 1993, pp.79-94; McKenzie-Brown 1984,p.6).

Conservation and Regulation: The Early Years

The rush for energy resources continued to prevail in Turner Valley, but the true extent to which the waste-stimulating, competitive environment had damaged the long-term profitability of the petroleum industry was made much more evident by the discovery of crude oil in 1936. Bob Brown's Royalite #1 penetrated deep enough into the Mississippian limestone to hit the oilfield lying beneath the gas reservoir. This stimulated Turner Valley's third and most substantial oil boom. Despite the continued shortage of markets and inadequate pipeline capacity, production in the valley soared, causing operators and provincial officials to become concerned about the resulting depletion of oil and gas reserves (Richards and Pratt 1979, p.56-57; Stenson 1985, p.42). At the

same time, it became evident to many of the oil producers that the past couple of decades of gas extraction — particularly, twelve years of continuous flaring — had not only been a waste of gas but had also reduced pressure on the oilfield. The pressure had decreased because the gas cap resting on top of the oilfield (which provided the drive that pushes the oil out of the reservoir) had been depleted. Since the pressure of the gas had been reduced so significantly, it became obvious that the ability to recover the oil had been irreversibly limited (Stenson 1985, pp.42-43). The positive aspect of this realization was that some sort of conservation scheme would rapidly be accepted as the only means by which the oil reserve could avoid being subjected to further damage.

Thus the drive for conservation and regulation gained the necessary momentum to achieve tangible results. Consequently, in 1938 the provincial government (led at this time by William Aberhart's Social Credit Party) passed the Oil and Gas Conservation Act. This created the Petroleum and Natural Gas Conservation Board, the predecessor of the present day Alberta Energy and Utilities Board (EUB). Particularly important to the future development of the Board, conservation was conceptualized exclusively in terms of preservation of resources and was not informed by any objectives of environmental protection. In other words, the Board had as its primary mandate the prevention of resource waste. It aimed to achieve this goal by implementing standards to control rates of production, distancing between wells, and flaring of gas (McKenzie-Brown 1993, p.71). In carrying these objectives out, the Board was similarly concerned with stabilizing relations between the independent operators and large companies. To

a certain degree, both sets of operators had a stake in this since the industry would benefit as a whole from the stabilization of prices that production controls could potentially facilitate. Nonetheless, the independents were concerned that it would be considerably more difficult for them to turn a profit under reduced levels of production than for Imperial Oil with its exclusive contract with Calgary's gas company (Richards and Pratt 1979, p.56-57).

The increased levels of production required during the war years made it easier for the independents to stay in business. This, however, did not help the effort to conserve the Turner valley oil and gas reserves. Moreover, gas wastage remained acute, and the situation was further complicated by Imperial's refusal to abide by the Board's production quotas. Imperial considered production restrictions to be economically unfeasible and neither the federal or provincial governments were willing to force it to comply with the quotas. This provoked independent operators to accuse the Board of facilitating the takeover of the valley's petroleum fields by the major companies. Ultimately, the Board brokered a deal whereby Imperial would adhere to production controls and abandon its exclusive contract with Calgary's gas company under the condition that all operators utilize its pipeline for a utility charge payable to Royalite (Richards and Pratt 1979, p.56-57).

History, Politics, and Oil and Gas Regulation in Alberta

The Board's struggles during the war years were reflective of an essential trend in oil and gas regulation, still evident in the pattern of petroleum regulation

in Alberta. The early conservation and regulatory movement surrounding the petroleum industry was largely informed by the goal of resource conservation as a strategy of efficient corporate economic development, rather than as a means of promoting domestic investment in the energy sector, ensuring environmental protection and securing the health and safety of Albertans. This reality shaped the development of the Conservation board in its early years and has had a profound effect on how it has subsequently formulated and carried out its various objectives.

The Board's emphasis on profitability was further demonstrated by the fact that, during the 1950s, substantial flaring of immediately unmarketable petroleum products still occurred. For example, propane was flared excessively in the summer, but during the colder winter months imports from the U.S. were required to meet consumer demand. In this vein, after Imperial constructed the Leduc Gas Conservation Plant at Devon in 1950, it would simply flare surplus gas, propane, and butane when there was not immediate sufficient market demand. Apparently, this practice was accepted with little questioning by the Petroleum Gas and Conservation Board. One of the foremen working at the plant during these years has even remarked that staff at Imperial's head office were more likely than the Board to question decisions to flare excess hydro-carbons (Stenson 1985, p.76).

Conclusion: Developments and Trends in an Emerging Industry

The early development of the oil and gas industry in Alberta was characterized by a number of developments. Initial finds of oil and gas resulted in

financial speculation, increased prospecting and intense competition between producers. This often led to external investment in order to build essential infrastructure necessary to transport the petroleum resources to markets. Consequently major international oil companies such as Imperial began shaping the development of the province's petroleum resources. This process also contributed to vast waste of natural gas and thus the squandering of a resource with the potential to contribute significantly to the economic prospects and public interest in the province. This eventually encouraged the movement toward regulation as it became evident that the industry and the province's population could benefit from regulatory standards which could facilitate more sound management and development of Alberta's petroleum resources. Yet, the process of speculation and competition that damaged the oil and gas fields during these earlier years led to substantial environmental destruction and pollution. The social and political environment was not, however, strongly affected by these concerns, so regulation remained influenced primarily by the desire to promote efficient and profitable resource development. Protection of environment and health thus awaited the coming of future generations of rural residents who would perceive such considerations to be necessary to a meaningful definition of public interest.

2B. From 1947 to the 1980s

Introduction

Intensive development of the province's oil and gas economy occurred following the discovery of oil at Leduc in 1947. As a result this was an era which witnessed the emergence of Alberta's modern identity as a prosperous petroleum-producing region. Remarkable economic expansion occurred, including the development of a considerable manufacturing industry necessary for the processing of increasing volumes of oil and gas. A vast pipeline network began zigzagging across the province in order to deliver Alberta's resources to an expanding continental market. To a significant extent these events led to a firm belief by many of the province's residents that the oil and gas sector contributes considerably to the public interest. However, by the 1960s, numerous gas flares and many large gas plants responsible for substantial emissions of hydrogen sulphide, sulphur dioxide and other hydro-carbon compounds were dotting the countryside. The impact of these facilities on local environments in agricultural regions was responsible for creating numerous critics of the practices of oil and gas companies during the 1960s and 1970s. Thus during a period of growing environmental awareness internationally some rural Albertans were criticizing the contribution of the oil and gas industry to the public interest in their communities and they were increasingly deciding to take action to influence companies to change their practices. The need for the oil and gas industry and government to take stronger measures to ensure public safety in communities

surrounding oil and gas facilities was dramatically heightened during the 1980s following the Lodgepole sour gas well blowout. Thus during these years of rapid and extensive development of the province's energy resources growing numbers of rural residents were becoming increasingly aware that protection of local environments, along with human and animal health, are measures which are very much in the public interest.

Leduc and the Development of Alberta's Modern Petroleum Industry

The era of seemingly unlimited expansion in Alberta's petroleum sector that was inaugurated in 1947 with the initial discovery of the Leduc #1 field was followed by rapid intensification of exploration and drilling activity. In March, 1948, the Atlantic Leduc #3 well blew out. Shortly thereafter workers pumped drilling mud into the hole in order to cap it. This caused oil and gas to disperse into various underground formations and eventually surface in geysers of mud and oil in a ten-acre area surrounding the well that had started blowing out again. It took six months for crews to get the well under control, during which time 1.4 million barrels of oil were recovered from ditches and gathering pools. The size of the blowout and clean-up operation attracted significant media attention, which helped to establish Alberta's international image as an oil-producing region. A succession of major discoveries soon followed, making Alberta one of the world's key centres of petroleum exploration.

Pipelines, Exports, and Processing

Substantial exploration and extraction activities by the international oil companies led to an emphasis on export markets and massive investment in the infrastructure necessary to get petroleum resources out of the province. Thus the 1950s and 1960s became the era of pipeline construction; its role in the province's economic development is comparable in importance to that of the building of the trans-continental railroad in the development of Canada's economy. By the end of 1951, construction on the Interprovincial Pipeline System Ltd. had allowed for movement of Alberta oil to Superior Wisconsin where it could be transported to markets via great lakes tanker ships. In 1953 the line reached Sarnia and in 1957 Toronto was linked to the system, making it the longest pipeline network in the world. On the other side of the continent, oil leaving Edmonton reached Vancouver and Seattle by 1953 via the Trans-Mountain Pipeline (McKenzie-Brown 1993, p.23-36).

The process of granting export licenses for natural gas was more politically contentious, so gas exports began somewhat later. In 1949, the Dinning Commission, appointed by the provincial government, endorsed the principle that Albertans should have first access to Alberta gas and that Canadian users should be granted priority over foreign customers. The provincial government adopted the Commission's recommendations that only gas in excess of a 30-year domestic supply should be licensed for export. As early as 1956 gas extracted in the Peace River region of Alberta and northeastern British Columbia was arriving through the Westcoast Transmission Pipeline in the lower mainland

area. On October 27, 1958, two weeks after the completion of the TransCanada pipeline, natural gas from Alberta began arriving in Toronto. In 1960 the National Energy Board approved applications for the export of natural gas outside of Canada. Thus in 1962 the Alberta Gas Trunk Line (AGTL) was gathering natural gas from its network of pipelines within Alberta and sending it to markets in California, supplying customers in other states en route. The transcontinental network of pipelines delivering oil and gas from Alberta to destinations throughout North America continued to expand through the latter half of the 20th century. This trend has been accentuated over the past decade since earlier conservation concerns which linked exports to domestic supply were abandoned in 1987 by the Mulroney government as part of its energy deregulation initiative (Conrad 1999, p.102; McKenzie p.23-27).

Oil and gas exports not only led to expansion in the petroleum transportation sector, they also played a fundamental role in the growth of processing facilities in Alberta. This is because gas must be processed before it can be transported through pipeline systems. Processing, or sweetening (removal of hydrogen sulphide from the natural gas), of sour gas is also required in order to make it safe for residential and industrial use. Partly due to these reasons, in 1961 alone Canada's natural gas processing capacity increased by 815 million cubic feet a day. Petroleum processing is also undertaken to extract valuable by-products. Consequently, during the 1950s and 1960s, there was a vast expansion of industries based on the marketing of petroleum resources extracted as by-products of oil and gas processing. Some of this processing included the

production of sulphur from hydrogen sulphide. The production of sulphur increased in part because of the growth of markets for elemental sulphur (which is used in chemical fertilizers). The processing and marketing of elemental sulphur also provided a convenient incentive for gas processing facilities to attempt to meet newly established provincial air quality objectives. As new processing facilities proliferated during the 1960s and 70s there was also a substantial increase in the extraction of liquid petroleum gases such as butane, propane and ethane, and the manufacture of a wide assortment of petro-chemical products (Petroleum Communications Foundation 2001, p.29; McKenzie-Brown 1993, pp.29,31).

Resource Prosperity and Economic Dependency

Prior to 1947, Alberta's main staple export was wheat, and its economy differed little from those of Manitoba and Saskatchewan, the other leading wheat-producing provinces. By the early 1950s, Alberta's leading staple export was oil and this held profound implications for the evolution of the province's economy. This period witnessed a diversification of the province's economy due to the emergence of secondary processing industries based on petroleum extraction, massive growth in construction (tied to the economic base of petroleum), and burgeoning public revenues. The province's population nearly doubled in the twenty-five years following the Leduc discovery. Edmonton and Calgary were transformed from mid-sized provincial cities into relatively large population centres with two of the highest economic growth and investment rates in the

country (Gould 1976, p.100; Shaffer in Leadbeater ed. 1984, pp.174-75). Yet a significant manufacturing sector, independent of petroleum extraction and processing, has to this day failed to emerge in the province.

The years following Leduc #1 were also a time when the major international oil companies firmly established their dominance in Alberta's petroleum industry. The remaining members of the seven key international oil companies of the day followed Imperial into the province, partaking in a bonanza of oil exploration and extraction. This granting of petroleum resource ownership to some of the world's most powerful corporate entities in a landlocked province, isolated by vast distances from the continent's main population centres, undoubtedly helps to explain Alberta's growing dependence on petroleum. Foreign-owned companies are generally less inclined to invest in economic sectors of a host country not directly related to their interests. Also of relevance to understanding petroleum's inability to spur diversification is the extent to which powerful resource industries can exert influence on government policy in an economically vulnerable region situated at a competitive disadvantage to areas geographically better positioned to engage in effective economic diversification.

Gas Plants, and Agriculture: The Early Years of Environmental Awareness

During the late 1950s and throughout the 1960s and 1970s, growth in extraction and processing contributed to a new array of environmental concerns because refining required the extraction and consequential flaring, venting and storage of increased amounts of hazardous chemical by-products. Adding to the

petroleum industry's environmental impact was the effect that increased extraction had on the type of gas that was being removed. Over time, drilling more often occurred at greater depths where there is a higher tendency for gas to be sour. Similarly, as the industry expanded throughout the province, exploration and extraction activities moved further west into the eastern slopes region² where sour gas is more abundant and is generally found in higher concentrations than in other parts of the province.

The granting of export licenses in 1960 to Trans-Canada Pipelines Limited (TCPL) and Alberta and Southern Gas Company (A&S) inspired the Alberta Department of Health to create an Air Pollution Branch. Similarly, the passing of air pollution control regulations occurred in 1961 with an implementation period of two years at new facilities; existing plants received a five year exemption from adherence to the new rules, thus marking the beginnings of the now contentious practice of implementing grandfather clauses when passing new emission standards³. Air monitoring programs were required to meet standards set by the Department of Health. The Conservation Board further outlined a number of measures that gas processing plants were expected to follow. These included the somewhat vague goal of recovering as much sulphur from the gas as was economically feasible (interestingly, profitability was a determinant in the implementation of health standards). Similarly, all sulphur that was not recovered

² The eastern slopes are located directly to the east of the Rocky Mountains and, like the Rockies, they run in a north-south direction. The Alberta foothills are a significant geographical formation within the eastern slopes region. Petroleum industry activity is quite pronounced in many parts of the eastern slopes region due to the large quantities of oil and gas found within this geological formation.

was to be flared (this process converts most of hydrogen sulphide into sulphur dioxide and a number of other chemical compounds). Thus, standards were set for acceptable ground level concentrations of sulphur dioxide. In 1967 the Department of Health complemented its air pollution control program by establishing a water pollution branch. This resulted in the inclusion at many gas plants of settling ponds where polluted wastewater could be treated.

In 1971, one of the last acts of the soon to be replaced Social Credit government was the creation of a Department of the Environment that would be responsible for enforcing the new Clean Air Act and the Clean Water Act. When the Conservative government was elected to power that same year it sent out the message that it would take environmental issues seriously. To demonstrate this new commitment in 1972, the Minister of Environment requested that the Conservation Board initiate public hearings on the impact of gas processing plants. The final report pointed out that during the previous year the province's sixty-four sour gas plants emitted an average total of 1300 tonnes of sulphur dioxide per day, with a recovery rate of 95.3%. Other environmental problems communicated in the public consultation report were the spread of dust from sulphur storage and handling, waste water, waste chemicals, and smoke (Stenson 1985, p. 290).

³ The practice of grandfathering by the EUB allows certain existing facilities to be exempt from new emission standards.

Sour Gas: The Early Emergence of Rural Resistance

Beginning in the late 1950s, but increasingly evident during the 1960s and 1970s, relations between petroleum companies and certain rural communities came to be characterized by frustration, distrust and an emerging adversarial undercurrent. Certainly one of the reasons for this was the growing volume of chemicals, particularly hydrogen sulphide, being flared and/or vented into the atmosphere. However, the industry was also moving into parts of the province, such as Pincher Creek, the Rimbey region, and the Olds-Didsbury area, where agriculture provided much of the employment. As petroleum exploration, extraction and processing increased in such areas, it became evident that the agricultural economy, in conjunction with human health, could experience noticeable impact from these activities. This led to an increase in negative perceptions of the effects of industry practices. Some of these regions, such as Pincher Creek in southwestern Alberta, stood in contrast to Turner Valley where historical dependence on the oil and gas economy created a situation wherein a majority of the inhabitants were directly employed by the industry. Turner Valley residents were also not tied to specific geographical locations, rather they tended to follow industry activity as it expanded throughout the region, so they were less likely to engage in overt or organized opposition to industry practices. The agricultural communities, on the other hand, had been previously little affected by industrial facilities. As the petroleum industry went through rapid large-scale expansion it located facilities and infrastructure in much closer proximity to rural homes and population centres. Consequently, as oil and gas operations

impacted these predominantly agricultural communities some rural residents became frustrated with their new industrial neighbours and thus began criticizing and challenging their practices.

Another contributor to friction between growing numbers of rural residents and the petroleum sector was the heightened international concern in the 1960s and 1970s with environmental issues, particularly chemical pollution of air, water and food supplies. Such concern was stimulated by day-to-day observations of environmental deterioration and change, increasingly prevalent media coverage of environmental catastrophes, and growing critical scrutiny of industry impacts on health and the environment. The extent of the environmental transformation which was occurring at this time was captured by Rachel Carson in her 1962 international best-seller *Silent Spring*, where she postulated that “for the first time in the history of the world, every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death” (Carson, Rachel. 1964, p.24). Although Carson’s investigation was primarily into the effects of pesticides it connected to a broad range of issues not specifically related to agricultural chemical use. Some of Carson’s observations in *Silent Spring* informed emerging debates, many that are still with us today, including discussion of chemical impacts on environment and health, the undemocratic nature of scientific-expert knowledge, the degree to which chemical impacts are a public versus technical-expert issue, and the public’s position in risk assessment and decision making processes pertaining to hazardous chemicals and technologies (Gottlieb 1993, p.82).

Increasing exposure of the general public to critical analyses of industrial society by academic activists and social movements encouraged growing numbers of people to take note of the health and environmental consequences of industry activities. Not surprisingly in this atmosphere the major issue of contention surrounding the oil and gas industry was hydrogen sulphide emissions. This public concern with the health and environmental effects of pollution was another factor absent in the years of the development of the Turner Valley field. However, by the 1960s the toxic nature of hydrogen sulphide, its capacity to induce death at low concentrations, and its unpleasant smell, were making sour gas emissions a noticeable and volatile issue in gas producing regions.

Early Rural Activism: The Case of Pincher Creek

In 1959 the province's department of health began its first air pollution monitoring program when it sent a trailer out to Pincher Creek to gauge the level of hydrogen sulphide and sulphur dioxide emissions from the British American (B.A.) Pincher Creek gas plant. The gas being processed at the plant, which was located in a populated farming area at the foot of the Rocky Mountains, was extremely sour (containing high levels of hydrogen sulphide). The plant itself was considerably larger and of much higher pressure than other plants in the province, thereby further contributing to the greater hazard it posed. Fred Stenson explains the sequence of events at Pincher Creek, which it should be

noted mirror a pattern that has now played itself out numerous times in the eastern slopes region:

In the first months of operation at Pincher Creek, Stage One, with metallurgical failure and plant upset the rule, complaints from local farmers began to roll in. The lead-based paint on their buildings was turning rainbow colour, their barbed wire was corroding; and when 180 million cubic feet of gas went up the emergency flare stack, especially in winter with snow on the ground and a low cloud ceiling overhead, the roar and blanket of illumination for miles around gave rise to simple, honest-to-goodness fear. Martin Bretz (plant manager) had a policy that all pollution complaints must be answered within a half-hour period but nonetheless, people were growing angry with their new industrial neighbour. Unfortunately, the two sides in this dispute began to polarize, with government busily running tests in the middle (Stenson 1985, pp.285-86).

These tests supported B.A.'s argument that emissions did not exceed acceptable levels. Nonetheless, concerned farmers and the company itself expressed doubt about the accuracy of the air monitoring devices utilized (Stenson 1985, p. 286). Sour gas emissions thus remained a contentious issue in the Pincher Creek area.

Following the construction in 1962 of the Shell Waterton plant in the same region as the B.A. Pincher Creek plant, and just prior to the implementation of emissions standards for new gas plants, complaints by farmers increased. Eventually a number of farming families launched a lawsuit against both Shell and B.A.. The case was resolved when the families agreed to an out-of-court settlement of \$750,000 (Stenson 1985, p. 286). By settling the dispute out-of-court in a private deal, these families participated in a method of conflict resolution commonly favoured by industry when concerned citizens decide to take concerted and organized action. The companies prefer to avoid the

development of negative public perceptions of their activities that are facilitated by the press coverage that court cases often receive. A common element in most out-of-court settlements is a clause that prevents recipients of compensation from speaking out about the details of the settlement including the complaints put forward; such statements usually allow companies to avoid admitting liability⁴. Rural residents, many of whom feel intimidated by the economic resources companies possess and the scientific discourses utilized by experts representing them, often also prefer to avoid launching court cases or organizing public hearings⁵.

The story of Janet Main may serve to contextualize the situation in the Pincher Creek area during these early decades of environmental concerns related to sour gas extraction and processing. Janet's husband Bill started farming in the area in 1948 and she joined him four years later. They decided not to participate in the legal case against Shell, opting instead to negotiate with the company. Their story is particularly interesting due to the extent of their problems with industry, their role in organizing resistance against polluting companies, and the fact that Janet has been maintaining a daily ranch journal for close to 50 years. The case of Pincher Creek during the 1960s and 70s is also particularly informative since the pattern of events that unfolded there have since been seen

⁴ An interesting caveat was attached to the out of court settlement signed between the Pincher Creek farm families and shell which stipulates that regardless of how many times the land is sold anyone who purchases any parcel of it must first sign a twenty-five page waiver stating that Shell cannot be blamed for damages (CASA Animal Health Workshop 1999, p.69).

⁵ In fact, until the summer of 2000, when Olds area rancher Doug Jones won his 8-year court battle against Mobil Oil, it had been over 20 years since an oil company had been ordered by an Alberta court to compensate a farmer for damage done to livestock (*Edmonton Journal*, p.A1, Sunday, July 23, 2000).

again and again in other agricultural communities in the province. Janet's journal, which was published in the Clean Air Strategic Alliance's *Animal Health Workshop* publication in 1999, is in a sense a window into the nature and extent of the negative experiences suffered by some concerned rural residents living in close proximity to sour gas facilities.

Janet's concerns with industry began in 1956 with the drilling of the first sour gas well in the area. In 1957, Bill and a number of others in the surrounding area organized a Surface Rights Protection Association that would help them deal with impacts related to sour drilling activity. At that time, Janet was observing some of her family's new health problems. These included "rashes, sore eyes, eczema, diarrhea, breathing difficulties, mouth irritations and other symptoms" (Clean Air Strategic Alliance, 1999, pp.59-61). Some of the changes Janet began observing in 1961 included the construction of roads and electrical lines to meet the industrial requirements of the gas plants. In subsequent years she recorded frequent gas discharges, pollution from sulphur dust, failing berry bushes and dying willow trees in close proximity to the plant. Then in the years 1963-65, Janet and Bill observed dead animals following what are termed "bad gas events", pigs with nose bleeds and diarrhea, calves born without front legs, emphysema in livestock, running eyes, problems with placentas and sudden death in certain animals. Mixed with these reports are recordings of meetings with the air pollution board, doctors, veterinarians, and other ranchers. She recorded similar events through the 1970s, including a well blowout in 1977 that released hydrogen sulphide and methane. There are also observations of alfalfa

crop failure in 1978 following more “bad gas events.” After presenting her journal entries to the Clean Air Strategic Alliance’s Animal Health Workshop in the late 1990s, Janet claimed to feel somewhat assured that committed people with intelligence and integrity were dealing with issue of reducing air emissions (Clean Air Strategic Alliance, 1999, pp.59-61).

Janet and Bill’s experiences during these years were reflective of those of many rural residents in communities affected by sour gas plants, wells, pipelines and other facilities during the 1960s and 1970s, and even today (CASA 1999, pp.59-61). As noted in Janet’s journal, the entrance of oil and gas companies in an agricultural region changes the surrounding landscape and quite rapidly appears to have a negative effect on vegetation, human and animal health, and ultimately agricultural productivity. Like many other rural residents in the province, the Mains’ did not choose a confrontational approach in dealing with industry and regulatory authorities. Although presently there are increasing numbers of devoted activists in rural regions, Janet and Bill Main, like many rural residents, do not fit the profile of activists. Rather, they carefully observed the environmental and health impacts of industry activity and held faith in the process of negotiation as a means of resolving such issues.

Lodgepole: Alberta’s Sour Awakening to a Hazardous Industry

On October 17, 1982, the most famous sour gas well-blowout in Canadian history, and one of the worst sour gas incidents in the world, occurred at a well operated by Amoco close to a small community in west-central Alberta named

Lodgepole, after the ubiquitous pines that grow in this part of the province. The blowout lasted for 67 days and the approximate rate of emission of elemental sulphur ranged from 900 to 1400 metric tonnes per day. This exceeded the combined estimated sulphur emissions of 750 tonnes per day from all sour gas plants, coal burning electrical power plants and oil production from bitumen (tar sands) in the province (Bertram, Henry 1996, section 6.2). At this time it was generally believed that it was not possible to bring high-pressure gas wells under control while on fire. Consequently there were two periods of time amounting to 27 days in total when the well simply vented a vast array of chemicals into the atmosphere, and 40 days during which this complex chemical blend was burned. In the effort to bring the well under control two workers died when they inhaled the toxic hydrogen sulphide. Eventually, well control experts managed to successfully cap the well while it was still burning (Petroleum Communications Foundation, 2000, p.29).

The two phases of venting during the Lodgepole incident spread odorous sour gas over a vast portion of western Canada spanning as far as Winnipeg, at approximately 1200 kilometres to the east. Residents in much of central Alberta including the city of Edmonton over 100 kilometres to the northeast, endured the rotten egg odour for just under a month. In total, 16 people in the province were sent to the hospital due to exposure to emissions from Lodgepole (McKenzie-Brown 1993, p.82). This was perhaps the defining moment in many people's lives—the author's included—in terms of acquaintance with sour gas, not only as a noxious smelling substance, but also as an issue of public safety and as a

health concern. People living in close proximity to the well reported a wide variety of afflictions, including respiratory ailments, headaches, eye irritation, nosebleeds among children and gastrointestinal problems. This encouraged the ERCB to hold a public inquiry into the incident. In its final report the inquiry explained that the accident probably could have been avoided had Amoco followed a more cautious drilling policy with critical sour wells—those presumed to possess a significant public risk—and if it had a better system for dealing with such occurrences. The report also stated that public concerns, fears, and even anger about the incident were understandable (Morris, Nov. 7, 1997, p.5).

Lodgepole: Public Awareness and Regulatory Change

The Lodgepole incident and the subsequent inquiry led to a thorough review of regulations governing sour gas drilling and the eventual implementation of Canada-wide emergency response standards. Companies currently drilling critical sour gas wells must now utilize up-to-date safety technologies, adhere to setback distances from homes, buildings, highways, and facilities such as pipelines etc., compile emergency-response plans and communicate their imminent drilling aims to local residents (Griffiths, 2001, p.23). Similarly, when uncontrolled emissions take place, if concentrations of hydrogen sulfide reach the level of 20 parts per million, the affected area now has to be evacuated. Notification must occur with the option of voluntary evacuation of sensitive individuals when hydrogen sulphide levels reach 1 part per million. When levels are at 10 parts per million or higher notification of the general public must occur,

with voluntary evacuation a possible course of action communicated (Morris, 1997p.6; Griffiths, 2001, p.24-25). The fact that these specific standards did not exist prior to the Lodgepole incident displays the extent to which the public interest was brought further into the regulation of the petroleum industry in Alberta following this event.

To the credit of industry and the regulations put in place by the ERCB, only one blowout from a critical sour gas well has occurred since 1984. In September 1998, a well northeast of Nordegg blew out of control for two hours before it was successfully capped. Lodgepole was therefore a turning point in the regulation and management of critical sour gas wells (Petroleum Communications Foundation 2001, p.29). Yet credit for such an outcome should also go to rural residents who responded with a heightened consciousness to the potential hazards of sour gas by observing industry practices with greater scrutiny and taking a more activist approach to dealing with associated human and animal health issues. Moreover, as indicated by the numerous recommendations made by the Provincial Advisory on Public Safety and Sour Gas in its report *Findings and Recommendations* (sect 1.3.6) there are still many steps that can be taken to further enhance standards for emergency response plans (Griffiths February 2001, p.25).

Increased awareness has emboldened rural residents to raise other issues with industry and the EUB than those related to blowout conditions. For instance, there is growing concern about chronic low-dose exposure to emissions from gas facilities during routine operation. Industry, the EUB and the

Department of the Environment have been much less responsive to the human and animal health implications stemming from such situations. Not surprisingly, regulatory changes have not been nearly so swift and there has been very little funding made available for study of low-dose exposure issues in a province so profoundly influenced by sour gas extraction and processing.

Conclusion: Benefits and Pitfalls of Oil and Gas Development and the Emergence of Rural Reaction

The growth of the petroleum industry in Alberta following Leduc profoundly influenced the development of Alberta's modern economy. The rapid emergence of the oil and gas economy is generally accepted in Alberta as a period of excitement that has created much opportunity, prosperity, and future social, political, and economic potential. Thus it is important to recall some of the implications of the petroleum industry's development. Alberta has experienced massive growth of oil and gas extraction and processing activities. This has created remarkable economic growth, much of it stimulated by international oil companies which developed vast complexes of drilling, processing and refining facilities along with an elaborate pipeline network necessary for transporting petroleum resources to markets. Yet this growth simultaneously brought about a situation of dependency on petroleum. In this vein, Alberta's economy was less diversified at the end of the 20th century than it was in 1971 (Anielski et al. April 2001, p.9). Moreover, oil and gas extraction and processing have resulted in the emergence of considerable hazards and damage to the environment, human and

animal health, and agricultural economies in rural Alberta. This has, in turn, led to changes in how the oil and gas industry is regulated, but it has also contributed to a consciousness among many rural residents that they must critically observe and monitor the activities of petroleum companies and take action against them when necessary in order to protect their own interests. How certain cultural and political forces in the province have shaped these struggles is where this analysis now turns.

3. Populism in Alberta

Introduction

Populism has played a central role in the conceptualization of public interest in the province. Initially a political force aimed at protecting poor prairies farmers against Central Canadian political and economic elites the dominant rendition of populism in Alberta has been formulated by politically conservative governments in an era of considerable economic growth via petroleum production. Consequently, the populism expressed by provincial governments and the business class in Alberta, though distrustful of Central Canada, has not focused critical attention on the social, economic and political impacts of the oil and gas industry. This poses a challenge for rural residents concerned about the practices of the oil and gas industry because populism is ostensibly a vehicle for defending their interests. However, official populism in the province actually serves to overshadow critical scrutiny of the oil and gas industry by conceptualizing and promoting Central Canada as the primary threat to Albertans' interests rather than powerful petroleum companies that tend to contribute to pollution and deterioration of regional environments.

From Defence of Farmers to Protection of the Oil and Gas Industry

It is of critical importance to analyze conservative populism — a unique aspect of the political culture in Alberta — in order to understand how environmental and health disputes surrounding the oil and gas industry have

unfolded. In Alberta, right-wing populism was formed largely through the relationship between the dominant forces in the petroleum sector and politically conservative provincial governments; it has passed through various stages in its development in the province. Beginning with the drive for control of the west's resources by western provincial governments, populism reached its apex through its role as a political mechanism for the defence of prairie farmers against the economic manipulation of central Canadian bankers and the neo-colonial machinations of the federal government.⁶ After the discovery of crude oil at Leduc in 1947, populism was no longer used by politicians in purported defence of the interests of those vulnerable to large economic institutions, such as farmers and small-scale merchants (Richards and Pratt p.35). However, a number of aspects of prairie populism were retained and even continued to develop. These include the notion of western alienation, the mythology of petroleum-driven prosperity, the belief that oil and gas resources allow Alberta to counter the insensitivity of federal governments, and the tendency of conservative provincial governments to retain a rural folksy imagery. These aspects of the political culture in the province have served to conspire against criticism of the petroleum sector, such as its dominance by foreign corporations,

⁶ The Progressive Conservative party led by Peter Lougheed unseated the Social Credit Party in 1971 after it had been in power for 36 years. The Conservative party has now been in power for over 30 years and the Social Credit Party is very much a fringe political force in the province. Social Credit initially came to power in the middle of the depression and retained a rural folksy appeal to farmers and other Alberta residents who felt that the federal government in Ottawa was politically insensitive to their concerns and hardships. The Progressive Conservative party has attempted to project a more modern image while also deriving support by maintaining strong ties with rural communities and acting in tune with the political sentiments that these places are perceived to generate.

and its impact on the environment, human and livestock health, and agricultural productivity.

Despite having numerous manifestations, populism can be described as a social and political movement that cuts across class lines and mobilizes people according to their identity as individuals⁷. In a North American context, populism is usually associated with the struggles of common people, most notably farmers and other rural residents in the American mid-west and the Canadian prairies, to gain control of resources and keep in check the power of political and economic elites who were based largely in the east. The Canadian variant of populism had its beginnings in the early history of the prairies within confederation. Under John A. Macdonald's national policy, and well into the 20th century, Ottawa conceptualized the region as a largely agricultural hinterland of Central Canada. Macdonald and the coalition of politicians and businessmen who supported him encouraged settlement of the region as an agricultural frontier that would absorb European immigrants, and create a new investment frontier for central Canadian businesses. According to the formulators of the national policy, this in turn would

⁷ Populism first emerged as a political force in North America with the formation of the populist People's Party in the United States in 1892. It derived much of its support from small farmers in the south and mid-west who were deeply antagonistic toward banks and railroad companies. The banks aggravated these farmers through their tendency to foreclose on mortgages. The railroad companies drew their ire because they often charged exorbitant transportation rates for agricultural crops. More generally, however, this early American populism generated support through an overt critique of the profound degree of economic concentration in the United States at the time as was manifested by the huge fortunes of the "robber-barons" of industry and the large trusts that they controlled. The Nonpartisan League, which held office in North Dakota from 1918-1921 was ideologically similar to the populism of the United Farmer's of Alberta and the CCF, and it influenced both parties. The League supported farmer's cooperatives and undertook a process of state-ownership of industries in order to promote regional economic development. The League elected two candidates in Alberta in 1917 and this encouraged the UFA to enter into provincial politics in 1921 (Richards and Pratt 1979, pp.23-28; Marshall 1998, p 508; Outhwaite et al 1995, pp.494-95.).

create a national economy that could diminish the north-south pull of American markets (Richards and Pratt p.15-17).

When the west became part of Canada, the Dominion government gained control of the region's natural resources. Also in the late 19th century, the Manitoba and territorial government were not allowed to secure bank loans on their own accounts so their capacity to invest in economic infrastructure, education, and public works projects was considerably restricted. In this political context, the Dominion government granted vast tracts of land and mineral rights to the Canadian Pacific Railroad (CPR), various large companies, and powerful ranching interests. As settlement proceeded and the population of the region increased, western farmers, small merchants, journalists, and of course politicians formed a movement aimed at gaining control of the region's resources and securing compensation for the resources already handed over to outside interests. In fact, these goals created much of the momentum for the drive for provincial status, which was granted to Alberta and Saskatchewan in 1905. However, after gaining provincial status, ownership of resources was not granted to the western provinces until 1930, after another quarter of a century of agitation by westerners and their provincial politicians, and a ruling from Britain's privy council which took them out of Ottawa's jurisdiction (Richards and Pratt p.15-17).

Prairie populism has been expressed in both left-leaning and right or conservative manifestations. The two primary political vehicles for these forms of populism were the Co-operative Commonwealth Federation (CCF), as representatives of a socialist version of populism, and the Social Credit party as

the right-wing political voice of populism. In their classic study *Prairie Capitalism*, John Richards and Larry Pratt describe some of the essential characteristics of both variants. Left leaning populism was focused on forming a coalition between farmers and labour to offset the power of capitalists and the federal government. It also relied on an ideological critique of industrial capitalism, most notably railroads, banks, and large resource-extraction firms. Conservative populists, on the other hand, downplayed class conflict and emphasized the need for all westerners to unite against Central Canadian interests. Pratt and Richards stress that right wing populists focused their critique of banks almost exclusively on the control of the money supply. Both forms of populism defended the institution of the family farm, and in this sense they were essentially supporters of private property, and by extension capitalism (Richards and Pratt p.20-23).

The first populist party in Alberta was the United Farmers of Alberta (UFA), which can most adequately be conceptualized as a left-populist party. In representing the interests of farmers the UFA supported the movement to establish collectivist grain-growing cooperatives or pools which granted farmers greater market control and tended to stabilize crop prices. The depression of the 1930s encouraged the UFA to adopt a more radically leftist political platform, but having been in power since 1921, the party had become lethargic and was more concerned with retaining past accomplishments than ambitiously promoting change. This caused the leftist rendition of populism in the province to be associated with an increasingly apathetic and bureaucratic political party. Consequently, the Social Credit party, which promoted a right-wing populist

agenda, gained political popularity and came into power in 1935 under the leadership of an evangelical radio minister named William Aberhart. Social Credit was highly critical of the purported colonial ambitions of central Canadian politicians and bankers. The party aimed to ease the financial burden of farmers and stimulate economic growth by outlawing private banks and issuing a social credit or stipend to Albertans. The legislation aimed at private banks was struck down within two weeks of being passed and the implementation of social credit never actually occurred. In 1943, Ernest Manning took over leadership of the party and presided over a period of party bureaucratization similar to that conducted earlier by the UFA. The Social Credit also took a vehemently anti-socialist stance in order to fend off political opposition from the CCF, which had already established itself as a formidable political force on the prairies (Richards and Pratt p.20-23, 35).

Prior to 1947, Alberta had accumulated a large debt, which was perceived by many of its residents to limit the province's economic prospects and further restrict its political autonomy. In this economic and political context, Turner Valley oil and gas represented a potential means whereby Alberta could achieve further political and economic independence. Thus when crude oil was discovered at Leduc in 1947, and the petroleum sector rapidly expanded, Alberta was able to relieve its debt and achieve a significant degree of political strength within confederation (Richards and Pratt p.18-19, 35). This transformation of Alberta's political and economic fortunes occurred under the direction of Social Credit which had come to power with the support of a populist constituency highly

conscious of the struggles the province had to go through to overcome its political and economic alienation. Consequently, a strong mythology emerged in the province that extolled the central role that petroleum resources played in creating economic prosperity and the strengthening of Alberta's place within confederation.

Alienation via Resource Extraction Firms

The Albertans' profound distrust of Central Canada has distracted them from the reality of economic exploitation by foreign corporations. This means that alienation is not conceptualized as the extraction of resource wealth by foreign companies, and that when people criticize the activities of oil and gas companies they are perceived to be attacking the source of Alberta's prosperity, the foundation of Alberta's political strength and hard-fought autonomy within confederation, not to mention the most economically powerful members of the provincial population. For example, during the conflict between independents and Imperial in Turner Valley over adherence to the Board's conservation measures, the Social Credit government under Aberhart, and later under Ernest Manning, proved reluctant to intervene in the market either in support of small-independent operators or to influence the practices of larger corporations. This was in spite of the populist constituency and rhetoric of these governments. It appears that the Social Credit had decided that populist attacks on the behaviour of the federal government or greedy central-Canadian banks were acceptable, but large oil companies — regardless of whether or not they were foreign-owned or behaving

in the public interest — were to be treated differently due to their perceived essential role in the economic development and future prosperity of the province (Richards and Pratt, p. 57-58).

In this regard, the populist emphasis of the Social Credit was similar to the tendency expressed by successive Progressive Conservative governments in Alberta which have appealed to sentiments of western alienation in carrying out various struggles with the federal government. The Alberta Conservative Party has historically utilized western alienation and vocal criticism of the purported central-Canadian biases of Ottawa as a means of expressing its defence of Alberta's interests. Peter Lougheed, in particular, emerged as a near mythical figure to many of those concerned with defending Alberta against the interventions of central Canada. Lougheed gained his populist credentials by attacking the Trudeau government for depriving Albertans of untold amounts of potential wealth with its regulatory decisions from the early 1970s through to the implementation of the National Energy Policy (NEP) in 1980.

Lougheed came into office in 1971, determined to initiate a new era of respect by central Canada toward Alberta by challenging its perceived colonial attitude toward the west and rectifying imbalances in the province's relationship with the federal government. This was an understandable goal given the early history of the west in confederation with political and economic alienation creating intense resentment and distrust of central Canada in the region.

Richards and Pratt explain the political effects of this arrangement as follows:

Westerners of all classes came to perceive Ottawa as an imperial government, a complex of institutions organized by central

Canadian elites for the purpose of dominating and plundering the hinterlands. The provincial administration, whatever its political colouration, became the indispensable agent for attacking political colonialism and bargaining with external economic interests (Richards and Pratt, p.17).

It is therefore not surprising that as the west became relatively more politically and economically powerful within confederation — as it certainly had by the 1970s — its provincial governments continued even more vigorously to challenge and redefine federal decision-making, particularly in the realms of resource and energy policy.

By the 1970s, after over two decades of expansion in the oil and gas sector, and even more after 1973 with the boost to exploration and production stimulated by the oil price shocks of the OPEC crisis, Alberta was in a uniquely strong position to address grievances it had with Ottawa. Moreover, Alberta had a rapidly growing population, substantial government revenues and the more or less tacit support of the world's most powerful corporations. Therefore, when the Trudeau government implemented a surcharge on exports of Alberta crude, many Albertans feared the re-emergence of self-serving neo-colonial policies from a Liberal government supported primarily by Central Canadian voters. By appealing to latent, yet strongly felt, sentiments of western alienation among Alberta's population, the Lougheed government undertook a concerted political struggle against the federal government. This established a pattern whereby conservative governments appeal to notions of western alienation in order to defend their interests and occasionally undertake efforts at pressuring the federal government to further decentralize powers to the provinces.

Despite the insecurities still felt in Alberta about central Canada's intentions, it is not entirely clear that the policy decisions of the federal government in the latter half of the twentieth century have been mere contemporary extensions of the (industrial heartland-resource hinterland) concept of decision-making characteristic of the early history of confederation.

*What has often been neglected in the western alienation discourse is the fact that central to Trudeau's NEP was the implementation of measures aimed at giving domestic producers a foot-hold in Alberta's petroleum sector. This was viewed as important to the federal government at the time because the Canadian petroleum sector was dominated by large foreign corporations that acted as a financial drain on the country by channeling petroleum profits elsewhere. Conservative populism in Alberta, and governments which have espoused it, have conveniently overlooked the social and economic pitfalls tied to development based on foreign investment in resource extraction industries. In fact, Alberta's resource dependency has contributed to an economy that is less diversified today than it was prior to 1971 (Anielski 2000, p.9). Yet this issue does not appear to even enter official contemporary political debate in the province.

If Alberta has been treated as a resource colony by external powers it would be more adequate to identify the source of this neo-colonialism as imposed by foreign investment based largely in the United States rather than the purported central Canadian biases of Ottawa's politicians and bureaucrats. The various aspects of this arrangement are explained rather bluntly by Norman Conrad: "Land ownership (primarily by international major oil companies), debt

ownership (often by foreign parent companies), technology ownership and marketplace power, are all strings on the puppet industry, pulled from beyond the borders" (Conrad, p. 104). These realities have been accentuated in the decades since Lougheed left office due to a plummeting Canadian currency, deregulation, and rapid increases in exports of oil and gas that have accompanied increased U.S. demand and the suspension of export restrictions⁸ (McKenzie 1993, p.71; Conrad 1999, p.102).

Similarly overlooked in discussions about western alienation has been the critical role that Ottawa played in supporting Alberta's oil and gas industry after the reopening of the Suez Canal to supertankers which were capable of supplying global markets with cheap Middle-East crude following the Arab-Israeli war. By forcing energy consumers west of Quebec to purchase Alberta petroleum at prices inflated well above the world-price, Ottawa played a crucial role in supporting the temporary survival and future development of Alberta's petroleum industry (Morton 1997 p.253, 288-89). Thus, due to the implementation by the Diefenbaker administration of the market protections suggested by the Borden Commission, oil companies active in Alberta were granted a guaranteed market in Canada west of Quebec. Consequently, these companies could afford to conduct further exploration and marketing of expensive Alberta oil.

Populism in Alberta today is given political expression through the Reform/Alliance Party (federally) and the Progressive Conservative Party

⁸ Alberta legislation formerly stipulated that only gas not necessary to meet the province's needs

(provincially) both of which have strong connections with the petroleum industry and the rural populace. Populism is no longer manifested as a movement in defence of exploited farmers. Rather it has taken on a provincial identity whereby Albertans express a sense of pride or confidence in the province's economic fortunes. However, feelings of good fortune can only be understood within the context of western alienation and the role that resource wealth has played in strengthening Alberta's political and economic position within Confederation. Thus the resource wealth of the province has given the Conservative government a strong degree of confidence in its dealings with the federal government. Populism is also voiced in the media particularly in right-wing publications such as the *Alberta Report* which champion an extreme form of social and political conservatism and indeed provincial chauvinism (the latter which arguably inspired the creation of the Reform Party, which originally held ideas of western separatism). In this cultural and political environment, where it is widely perceived that petroleum resources have established the province as a place of economic prosperity and political independence, criticism of the environmental and health impacts of oil and gas companies is commonly frowned upon or dismissed. Claims made against industry practices are often perceived as a kind of threat to the province's modern identity built on resource wealth. Actions taken against oil and gas companies are easily interpreted by many in the province as seemingly foreign or even ridiculous and thus uncharacteristic of appropriate Albertan behaviour. Consequently — as will be explained in greater detail in

could be exported. Thus exports could only include gas in excess of a 30-year supply.

Chapter 6— Wiebo Ludwig's campaign against gas facilities in northwest Alberta was greeted with a strong response from the provincial government, which delegated resources for an anti-ecoterrorist unit in the RCMP.

Conclusion

Populism has transformed itself in the latter half of the twentieth century from a movement in defence of farmers against central Canadian financial and political interests into a provincial identity based on political conservatism and a confidence in the province's economic potential. To understand the extent to which conservative populism has influenced the province's political and cultural ethos, it is essential to view it in relation to the tradition of western alienation and the role that petroleum resources have played in establishing the province's political autonomy. The province's current identity is bound up with growth in the oil and gas economy; thus, when concerned rural residents challenge the practices of the petroleum industry they are not only resisting extremely powerful corporations and challenging an industry in which many members of their communities find employment, but they are also often perceived to be challenging the province's modern identity. The practices of the industry which has had such a significant influence on the province's identity, and which many rural residents increasingly feel compelled to question and take action against is where the analysis now turns.

4. Industry Practices: Health and Environmental Impacts

Alberta's the beachhead, the corporate plantation of Canada par excellence.
—Ralph Nader, Speech for the Parkland Institute. Edmonton, 1998.

Introduction

Oil and gas extraction, processing, and transportation have a profound impact on the environment. In fact, consideration of the extent of environmental contamination that results from petroleum production makes it difficult to understand how an industry with such impacts can be viewed as a contributor to the public interest. Thus, I believe, that it is necessary to discuss a variety of practices utilized by oil and gas companies in Alberta along with their environmental and health impacts and the public safety risks that they pose. In doing so I aim to expose the reasons for the growing numbers of rural Albertans who since the 1960s have become fearful of oil and gas facilities and in many cases have been willing to take action to prevent or minimize the health, economic, and environmental impacts of petroleum production. In this endeavour I also aim to expose the narrowness of the conception of public interest which has influenced the Klein administration's program of environmental deregulation which will be discussed in detail in the following chapter.

Alberta is the second largest producer of air emissions in Canada with Ontario holding the top position (Canadian Institute for Environmental Law and Policy, [http://www.scorecard.org/pollution watch/](http://www.scorecard.org/pollution%20watch/) Aug 15, 2001). The majority of emissions in Alberta come from the petroleum industry. Therefore, it is not startling that numerous practices of oil and gas companies contribute to the

environmental and health impacts of concern to so many rural residents; this is accentuated by the fact that oil and gas activity is highly concentrated in rural Alberta. In fact, according to industrial emissions data from Environment Canada three of the ten most polluted census jurisdictions in the country are found in rural Alberta (Canadian Institute for Environmental Law and Policy, Aug. 15, 2001).

The issue arousing the highest degree of concern and contention is the flaring of gas, particularly sour gas (natural gas containing more than one-percent hydrogen sulphide). This is also not surprising since hydrogen sulphide is highly toxic and exposure to it in very low concentrations can lead to sudden death. However, concerns surrounding flaring are not exclusive to hydrogen sulphide emissions, since more than two hundred and fifty other hydro-carbon compounds are released from a typical flare stack (this will be discussed later). In addition to flaring emissions, other emissions of concern are those released from glycol dehydrators which vent benzene, a cancer-causing carcinogen with no safe exposure levels, along with numerous other volatile organic compounds. Fugitive emissions and leaks from wells, storage tanks, and pipelines are potentially hazardous to human and animal health and can damage ecosystems. These emissions are the cause of widespread anxiety because of the numerous sources from which they can emanate and the vast geographic distribution of such facilities and/or infrastructure. The storage and handling of waste from oil and gas operations, particularly the dispersal of toxic drilling mud is an emerging, potentially highly volatile environmental and health concern because it can

contaminate groundwater sources and there is little regulatory monitoring of these practices (Marr-Laing, Severson-Baker 1999, pp.4-11). Finally, exploration and drilling activity have contributed to vast deforestation in numerous parts of the province, most notably in the northern boreal forest.

Flare Efficiency

Flaring is a means of disposing of unwanted gases and vapours through combustion in an open flame. The rationale for flaring is based on the assumption that, through the process of combustion, harmful substances, particularly hydrogen sulphide, will be efficiently converted into a more desirable emission than would be obtained through mere venting of gases (Johnson 2001, p.2) . The combustion of hydrogen sulphide in sour gas flares results in its oxidation into sulphur dioxide (oxidation is not complete as will be explained in detail below); sulphur dioxide is less odorous than hydrogen sulphide and is not as likely to result in toxic ground level concentrations because it is lighter and is dispersed in the atmosphere more effectively (PCF Sour Gas 2001, p.24; PCF Flaring 2001, p.10). Thus it is perceived to be a safer emission. Nonetheless, sulphur dioxide is a major source of acidic precipitation (acid rain) which adversely affects water sources, forests, crops, buildings and other infrastructure, and it contributes to human and animal health complications. For example, increased acidification has led to the eradication of certain species of fish, such as brook trout, from some bodies of water and the degradation of forests due to the stripping away of essential nutrients. Health problems stemming from acute

exposure to sulphur dioxide include respiratory infections, with long-term exposure potentially leading to chronic respiratory disease (Severson-Baker Marr-Laing 1999, p.4).

Even though there are negative repercussions of sulphur dioxide emissions, it is the idea that flaring causes such gases to oxidize into emissions potentially less detrimental to human and animal health which provides the justification for sending them through flare stacks. Consequently, it is very important to understand the extent of oxidation that occurs through flaring. Knowledge about oxidation processes is based on flare efficiency measures that predict the rate of combustion. Utilization of flaring has been premised largely on the assumption that flare efficiency results in combustion at rates exceeding ninety-five percent. Support for this assumption has been based to a significant extent on a U.S. study sponsored by the Environmental Protection Agency (EPA) (Johnson 2000, p.8). However, in 1996 the results of a study undertaken by Mel Strosher and commissioned by the Alberta Research Council (ARC) entitled *Investigations of Flare Gas Emissions in Alberta* shattered the perception that flares burn at rates in excess of ninety-five percent. Strosher measured emissions from two flare stacks and found flare efficiency varying from sixty-four to eighty-five percent (Strosher 1996). The release of these findings added quite dramatically to concerns surrounding the issue of flaring since, in the case of sour gas, unburned emissions are potentially toxic and can lead to a whole host of human and animal health complications, ranging from respiratory infections to

reproductive problems and increased occurrence of neurological disorders (Kilburn 1995, p.2-6; PCF Sour Gas 2001, p.24).

Other gases commonly found in flare streams that are cause for concern if not fully combusted include carbon monoxide, which reduces the absorption of oxygen in the bloodstream, potentially leading to injury or death in cases of high concentration exposures. Volatile organic compounds, if not fully combusted, can lead to increases in ground level ozone which adversely affects agricultural crops and forests and can result in irritation of the eyes, nose and throat, reduced lung functioning, and chronic respiratory disease. Another common element of flare streams is methane, a greenhouse gas that contributes to global warming at twenty one times the rate of carbon dioxide (Ross 1999, p.1). Inadequate assumptions about flare efficiency pertaining to methane thus have significant implications to predictions of the contribution of the oil and gas industry to global warming. The Strosher study also revealed the existence of more than two hundred and fifty different hydro-carbon compounds resulting from incomplete combustion. This is a considerably greater amount of gases and vapours than was previously known to exist in flare streams. Among these gases are highly toxic polycyclic-aromatic hydro-carbons and BTEX aromatics which consist of toluene, xylene, ethyl benzene and cancer-causing benzene. Other carcinogens released during flaring include benzopyrene, carbon-di-sulphide, and carbonyl sulphide while a number of heavy metals such as mercury, arsenic, and chromium are also emitted (Strosher 1996 pp. 82-112; Griffiths 2001, p.34;

Severson-Baker, Marr-Laing 1999, pp.4-5; PCF Flaring 2001, p.11; CPHA 2000, p.1).

The environmental health and economic implications of Stroscher's findings led to a strong public reaction, particularly in rural Alberta where the vast majority of flaring in the province occurs. For instance, in rural Alberta the one hour and twenty-four hour guidelines for ground level ozone are regularly exceeded, thus suggesting insufficient combustion of aromatic hydro-carbons (Marr-Laing, Severson-Baker 1999, p.5). This, in turn, holds negative ramifications for human health and agricultural productivity. Due to concerns such as these, the *Clean Air Strategic Alliance (CASA)* was set up to manage solution gas flaring in the province (solution gas is the type of gas found in crude oil. See glossary under solution gas). CASA is a multistakeholder body with representatives from industry, government and environmental groups. After its formation it reached an agreement based on voluntary compliance wherein the oil and gas industry made the commitment to cut emissions by twenty five percent by 2001. This target was successfully reached and industry is now working on a forty to fifty percent reduction for 2003, which, if achieved, will be followed by a sixty to seventy percent target for 2007. Starting on January 1, 2000, all new solution gas flares put into operation must adhere to new emission standards (Marr-Laing, Severson-Baker 1999, p.6; Griffiths 2001, p.35).

Despite the importance of these initiatives, there are significant shortcomings to this agreement, since flares that combust less than one hundred thousand cubic metres of gas per year — which is approximately fifty percent of

all flares — are not affected by the agreement. This not only affects reduction levels on a provincial scale, but has particularly significant implications for regions in which there is a high concentration of flares with smaller emission rates, which, when combined, result in quite high local emissions. Forms of flaring other than solution flares, such as gas plant flaring and well-test flares, are also not included in the agreement. It is also important to note that further regulatory changes are needed to alleviate rural residents' concerns about the flaring occurring in close proximity to their homes and/or agricultural operations (Marr-Laing, Severson-Baker 1999, p.6, Griffiths 2001, p.35). In fact, Phil Hanneman, rural landowner and consultant for those with claims against oil and gas companies, points out that even with the knowledge of the Stroscher study, the EUB has not changed its regulations allowing flares to be built at the distance of one hundred metres from rural residences (Staples July 23, 2000, E8).

Sour Gas: A Lethal Substance

Approximately thirty percent of gas produced in Alberta is sour, with projections of forty percent by 2010, so the incomplete combustion of hydrogen sulphide is an issue of great concern in many parts of the province. The majority of attention given to sour gas by industry, government, the EUB, and the media, however, has focused on acute human and animal exposures. These emissions usually take place in the event of an incident such as a sour gas well blowout or a pipeline rupture. Death occurs within minutes from exposure to hydrogen sulphide at the low concentration of seven hundred and fifty parts per million, as

the nervous centres in the brain that control breathing are paralyzed (fatal effects at such low-doses are why sour gas is designated a poisonous gas). Lungs can start filling with fluid at concentrations between one hundred and three hundred parts per million. Not surprisingly, acute concentration exposures may lead to pulmonary edema, which is potentially lethal. At fifty to one hundred parts per million, loss of smell occurs, which can of course increase the risk of fatality. Olfactory paralysis can also result from chronic low concentration exposure thus diminishing the reliability of hydrogen sulphide's rotten egg odour as an indicator of its presence. Rapid irritation of the nose, throat, and lower respiratory tract may occur at concentrations below fifty parts per million. At twenty parts per million, exposure can lead to severe inflammation of the lungs and eyes (Guidotti 1994, p.1; PCF Sour Gas 2001, p.13; T&P 2001, pp.1-3; Staples July 23, 2000, p.E9).

Despite the considerable risks associated with the handling of a gas that has fatal health impacts at relatively low concentrations, the Petroleum Communication Foundation boasts that in seventy five years of sour gas development in Western Canada, not a single member of the general public has been killed by hydrogen sulphide. However, approximately thirty workers have been killed since the late 1970s in the western Canadian sour gas industry (PCF Sour Gas 2001, p.13).

Unfortunately, there is a lack of research into the health impacts of flaring on humans and animals. During the past decade, only a handful of animal toxicology studies have been conducted, but these have established links

between flaring and health problems, and some medical research has established an association with respiratory disease and neurological dysfunction in humans. Despite the astonishing reluctance by industry, government, and the EUB to acknowledge human and animal health problems related to chronic low-dose exposures such as those incurred from flaring, rural residents in Alberta have recently experienced some success in drawing attention to the issue. The motivation of some rural residents to deal with the issue has been inspired by a combination of press coverage stemming, in part, from the Ludwig affair (see chapter 6) and recent research findings. However, decades of experiencing personal health complications and observing similar problems in livestock have made rural residents highly concerned about the current aggressive expansion of the sour gas industry into populated areas.

Hydrogen Sulphide and Human Health

The Petroleum Communication Foundation, in its sour gas information manual, responds to the belief held by many people that sour gas development has harmful effects on animals and humans by claiming “scientists have not been able to determine a precise cause-and-effect relationship between low-level exposures and the reported adverse effects” (PCF 2001 Sour Gas, p.13). I am not certain what 'precise' means in this case, but research linking health problems to chronic low-dose exposure to hydrogen sulphide does exist and is not new; in fact, in 1925 Howard Haggard reported in the *Journal of Industrial Hygiene* that prolonged exposure to low concentrations of hydrogen sulphide

resulted in damage to the central nervous system and eyes (Haggard, Howard in Morris Nov 7, 1997, p.1). Almost forty years ago, in 1962, Thomas Milby reported in the *Journal of Occupational Medicine* that in “low concentrations, H₂S (hydrogen sulphide) may cause headache, fatigue, irritability, insomnia, and gastrointestinal disturbances” (Milby, Thomas in Morris Nov 7, 1997, p.2). In 1978, a National Research Council subcommittee in the U.S. recommended that the EPA consider implementing a national emission standard for hydrogen sulphide. In 1995, Kaye Kilburn of the University of Southern California School of Medicine published a report in the medical journal *Toxicology and Industrial Health* which argued that chronic exposure to low doses of hydrogen sulphide contributes to neurobehavioral dysfunction. Kilburn reported that even in exposure cases where a loss of consciousness (an event termed a “knockdown” among oilpatch workers) does not occur, permanent neurological damage can take place. In his report he explains “the most surprising finding was that even moderate occupational exposure and insidious downwind environmental exposure to H₂S can cause permanent (neurological) impairment” (Kilburn 1995, p.5). Kilburn states that these findings “imply that neighbourhoods near refineries or other industrial sites where H₂S is released deliberately or inadvertently are unsafe” (Kilburn 1995, p.6). He has become an advocate for demanding changes to the oil and gas industry and has argued that emitting facilities such as wells, pipelines and gas plants should be relocated substantial distances from any human population even if such measures require billions of dollars in investment (Staples July 23, 2000, p. E9). Those sympathetic to the implementation of such

measures were given further support in 1996 with the release of a Finnish study in the *Archives of Environmental Health* which studied two towns, one polluted by hydrogen sulphide and sulphur dioxide and another one where such emissions were not present. In the polluted town there was found to be a substantially greater occurrence of respiratory infections, headaches and coughing than in the other town. The researchers argue that "these results indicated that adverse health effects of malodorous sulfur compounds occur at lower concentrations than reported previously" (Morris Nov 7, 1997, p.2).

In Pincher Creek in southern Alberta, as I have discussed, residents have tried to address health and environmental problems stemming from gas plant emissions since the 1960s. The area surrounding the contentious gas plants was thus appropriately chosen as the site of the only substantial attempt by the provincial government to study the issue of chronic low-dose exposure when the Southwestern Alberta Medical Diagnostic Review was undertaken there in 1996. Researchers from McGill University commissioned to conduct the study found no significant differences in health status between the Pincher Creek residents and those of two other communities which apparently did not have any similar exposures (CPHA 2000, p.1; Staples July 23, 2000, p. E9). The province generally has been comfortable with the notion that this study was the first and last word on chronic low-dose exposure (the province has provided funding for a joint study with the three other western provinces to conduct a comprehensive analysis of human and animal exposure to flare emissions, but the final results of this research will not be known for six years). Rural residents, activists, and a

number of medical researchers have not been as satisfied with the government and industry's position on health effects of flaring and cite numerous flaws in the McGill study. For instance, the researchers remarkably did not conduct air-monitoring tests to determine levels and contents of emissions. The work was also undertaken during a period of light industrial activity at both plants. And the one area of health differences identified by the researchers between communities — that of increased respiratory symptoms among children aged five to fifteen in the Pincher Creek group — was quite arrogantly dismissed by the researchers as potentially being the result of overzealous asthma reporting by parents (Staples July 23, 2000, p. E9).

One of the leading researchers on the health effects of hydrogen sulphide on humans, Tee Guidotti of George Washington University in Washington D.C., has made a point of speaking out about the reluctance of the Alberta government to fund health research in this area. Guidotti spent a decade at the University of Alberta during which time he was engaged in a constant struggle to secure funding for his research. He has appeared on radio condemning the government's attitude to such research, and in a 1994 study in the *International Archives of Occupational and Environmental Health* he stated that on two occasions, 1987 and 1991, his research team at the University of Alberta could not secure adequate funding for their research proposals (Guidotti 1994, p.159). In 1990, Guidotti and Sheldon Roth of the University of Calgary put together a proposal to establish a hydrogen sulphide research network in Alberta that would compile a registry of exposure victims. Industry and the government agreed to

jointly fund the program, but the province backed down at the last moment without explaining why. In describing this turn of events during a media interview, Guidotti argued that “government here is sometimes to the right of industry, there was a fear of what we might find (Morris Nov 7, 1997, p.7).” Guidotti left Alberta in 1999 partly because of the lack of government support for his research on hydrogen sulphide and health. Dr. Yagesh Bhambhani, a physiologist at the University of Alberta, explains that the most probable reason for the difficulty in securing funding for such a politically sensitive issue is the fact that “industry is not interested in funding research that might result in more stringent air-quality standards which could cost them money” (Nikiforuk Feb 10, 2000). The former chief chemist for the EUB Merle Korchinski has spoken out about the politically sensitive nature of research in this area; he explained in a media interview that he knows of a number of cases where impressive work has been prevented from being completed including research undertaken by ARC scientists on the neurological effects of low dose exposure undertaken between 1986 and 1991(Staples July 23, 2000 E8).

Hydrogen Sulphide and Animal Toxicology

There has been limited research conducted on hydrogen sulphide exposure and cattle health, although slightly more than in the area of human health. Similar to human health studies, animal toxicology research has established concrete effects at acute level exposures, ranging from death to respiratory illnesses, hair loss, eye irritation, and spontaneous abortions (Marr-

Laing, Severson-Baker 1999, p.13). The provincial government has a history of responding with distrust also to animal toxicology studies of hydrogen sulphide exposure. Particularly alarming is the case of a study entitled *Cattle and the Oil and Gas Industry in Alberta*, which was prepared by the Alberta Environmental Centre for the Alberta Cattle Commission in the early 1990s. This study reported that "hydrogen sulphide has an effect on cattle at <50 parts per million and can cause death at higher concentrations" (Bertram et al., 1996 p. vi). The study found correlations between animal health problems and impacts from both the operation of oil and gas batteries (see glossary) and sour gas plants. Some of the health effects identified that stemmed from flaring included respiratory problems, slow weight gain, gastrointestinal upsets, and increased heart rates. Consequently, the authors' recommended the oil and gas industry find ways to increase flare efficiency, and reduce the need for flaring with the goal of eventually phasing out the process. The study also ascertained health risks from crude oil, salt water and heavy metals that are released in the production and transportation of petroleum products (Bertram et al., 1996, p. vi). Instead of responding with concern, the Alberta Environmental Protection Department, in conjunction with CAPP, requested changes to the report and then rewrote sections and released the new, substantially edited, rendition of the study. The original report was not released to the public until 1996, when one of its authors, Dr. Udo Weyer, and the Alberta Environmental Centre threatened legal action. Dr. Weyer has responded to the episode in the media by explaining "some companies are still in a denial phase about pollution. They feel that, if you talk

about the environment, it's an attack on them" (Nikiforuk, Jan 30, 1999; Severson-Baker, Marr-Laing 1999, p.15).

The governments of British Columbia, Alberta, Saskatchewan, and Manitoba have committed to a comprehensive study of flaring entitled *Western Canada Study on Animal and Human Health Effects Associated with Exposure to Flare Emissions*. Researchers such as Tee Guidotti will be involved with this study. It is hoped that this research will provide a much greater understanding of previously under-researched areas like the human and animal health effects of chronic low-dose exposures. Unfortunately, due to the scope of the study, its final results will not be released until late 2006 (Proposed study Draft Feb 24, 2000, p.1-2). Guidotti believes that the reason this research is finally receiving support from the province is because it is no longer perceived to be an exclusively rural problem. There is definitely some validity to this idea, considering the significant growth of rural residential acreage-style communities in recent years, and the encroachment of the sour gas industry towards suburban neighbourhoods on the outskirts of Calgary and Edmonton. However, Guidotti laments the implications of prolonged inaction on the issue by explaining "we've now waited so long that an appropriate response into investigating the problem will not get the answers in time to help this generation. It's just going to take too long" (Staples July 23, 2000, p. E9). Government and industry may still end up maintaining their position that there is no hard scientific evidence linking chronic low-dose exposure with significant health risks until and perhaps beyond 2007 (this position would require ignoring well-respected studies such as Kaye Kilburn's which effectively prove

the links) (Nikiforuk Feb 10, 2000). With current gas prices high and conventional oil and gas reserves dwindling another six-year wait for evidence which may or may not help resolve the issue of chronic low-dose exposure is a much more agreeable and convenient wait for the gas industry than it is for those living close to gas flares.

In January, 2000 the EUB formed a multi-stakeholder group *The Provincial Advisory Committee on Public Safety and Sour Gas* to evaluate and provide recommendations on sour gas policies, standards and regulations as they pertain to public safety and health. It has received considerable feedback from residents living in sour gas producing regions. Interestingly, however, the mandate of this body encompasses human and animal health concerns surrounding short-term exposures to the exclusion of chronic long-term exposures. Nonetheless it was difficult for the committee to avoid this issue since these are the most common exposures related to sour gas flaring. Consequently the committee allowed for discussion of low-dose exposures which were consistently brought up as a cause for concern in the public outreach section of its work (PACOSG Dec, 2000, pp.1-4).

The Why and How of Flaring

The decision to flare gases is essentially an economic one determined largely by the cost of transporting given volumes of gas to markets, as well as by taxation considerations. Flaring alternatives do exist such as piping the gases to processing facilities, reinjection of gases into subsurface reservoirs, or

installation of gas-burning micro-turbines for local electricity use (CASA June 1998, p.2). However, these techniques are often rejected due to cost-benefit assessments conducted by companies who consider the economic viability of such techniques in relation to the reserve life of the oil and gas fuels being extracted. For instance, if the remaining operational life of a reservoir is considered minimal, then the installation of additional pipelines to transport excess gases to processing facilities or the purchase of electrical generating technologies will be rejected, since the projected profits derived will not be deemed sufficient to justify the costs of implementing the additional infrastructure. What is more, the royalty regime in the province, which makes flared gases exempt from royalty charges, is a means by which flaring is shortsightedly encouraged (CASA June 1998, p.4). The government has not announced its intention to alter the royalty regime to encourage conservation.

A variety of different oil and gas operations use flares. Key among flaring practices is solution gas flaring which contributes to approximately seventy-five percent of the volume of gas flared in Alberta. Solution gas is the type of gas that is found in crude oil. When oil is extracted, the pressure that holds the gas with the oil in the reservoir is released, causing it to bubble out. Solution gas can be sweet or sour gas (see glossary under sweet gas; sour gas) and it is extracted at batteries (see glossary) where oil from one or more wells is processed and stored (PCF flaring 2001, p.5). Solution flares burn continuously and are found at approximately five thousand battery sites distributed throughout the province,

with higher concentrations of flares in some regions than others (Johnson Aug, 2001, p.1).

Gas processing plants also contribute significantly to overall flaring and can have considerable impacts on local environments due to the large volume of emissions flared from a given facility. There are approximately six hundred gas plant flares in the province, accounting for around twelve percent of the total volume of gases and vapours flared. Gas plants extract water, hydrogen sulphide, carbon dioxide and natural gas liquids in order to make the natural gas ready for transportation to market (PCF 2000 Flaring, p.9). Extracted gases and vapours that are perceived by companies to be unmarketable are flared. It is not uncommon for routine flaring at gas plants to be interrupted by emergencies such as fires or other upset flaring conditions; these situations result in higher emissions than normal for their duration, so they are cause for concern among rural residents living in close proximity to gas plants (Johnson Aug, 2001, p.2).

In 1988, when new sulphur recovery standards were implemented in the province, there was a grandfather clause attached to the agreement that exempted numerous existing plants from the stricter regulations. This exemption holds considerable implications for local environments in close proximity to gas plants because of the high levels of sulphur dioxide emitted by the plants. Operators of these plants argued at the time that it would not be economical for them to install expensive sulphur recovery equipment on aging facilities. Therefore, the Board decided that the decision to grandfather gas plants would be based on assessments of upgrading costs to industry in relation to the

operating lives of the plants and the perceived benefits of installing sulphur recovery equipment. Unfortunately, sixty-one of these plants are still in operation with twenty-eight of them completely exempt from any sulphur recovery standards at all. Grandfathered plants account for approximately thirty two percent of Alberta's total sulphur emissions (EUB staff report 2001, p.2; EUB News Release Nov 25, 1999, p.1). Consequently reducing their emissions could considerably enhance air quality in rural regions. In 2000, a multi stakeholder group including members of industry, environmental groups and the academic community submitted a report to the EUB pertaining to the issue of grandfathered gas plants. It recommended companies be given \$100 million and twenty years to upgrade grandfathered gas plants (Staples July 23, 2000, E8).

The complexity of multistakeholder groups where many competing interests are hoping to secure their demands can encourage environmental representatives to make compromises on issues that have substantial impacts on environmental and human health in the hopes of achieving some success in the negotiation process. Thus Martha Kostuch, an environmental activist and member of the multistakeholder group, explained to the media that the concessions made by members of the groups increased the likelihood that the government would adopt the recommendations made (ENSPR April 26, 2000). Nonetheless the submission of the report created a considerable amount of exasperation among some rural residents who do not cherish what they see as another twenty years of exposure to unnecessary hydrogen sulphide emissions. Some rural activists also are not sure why profitable companies should be given

government money to encourage them to operate in a fashion that they presumably should be following in order to contribute more legitimately to the public interest (Staples July 23, 2000 E8,9; Phil Hanneman interview, Aug 2000).

Kaye Kilburn responded to the media regarding this issue with a degree of astonishment by explaining the possible ramifications of adopting the report:

It means they are sentencing all the ranchers and people who are living downwind to loss of brain capacity and sick and dying cattle. It's a disaster for everybody, but the oil companies (Staples July 23, 2000, E8).

The exemption of smaller gas plants (those emitting less than one tonne of sulphur per day) from sulphur recovery requirements is another regulatory loophole allowing for high levels of gas plant emissions. This regulatory exemption has significant implications for the future, since increased focus on extraction from smaller gas reserves has fostered a trend toward smaller gas plants that are exempt from sulphur recovery standards (Marr-Laing, Severson-Baker 1999, p.6; EUB News Release November 25, 1999). The EUB has also expressed concern that its more stringent sulphur recovery standards applied to new and larger plants "may be providing an unintentional incentive to build and operate a greater number of smaller, lower sulphur recovery facilities than would otherwise be the case"(EUB News Release Nov 25, 1999). Both grandfathered plants and the exemption of smaller gas plants from sulphur recovery standards are issues of serious contention in rural regions because they are seen by many as unnecessary. Such regulatory exemptions are thus commonly perceived to be a flagrant example of the petroleum industry, EUB, and the government

placing the economic interests of oil and gas companies ahead of the health of rural residents and the economic interests of agricultural operations.

Well test flares, which occur when a new gas well is drilled, are a further source of flaring emissions. Conducting well test flares provides information about the pressure and flow rate of the reserve being tapped, which in turn allows for assessments of adequate pipeline size and processing requirements. Well tests help determine the extent of a reservoir; this lets oil and gas companies make economic calculations for construction of infrastructure to service the well(s). When well tests occur they can run from four to twenty-one days with the well flowing at its maximum rate. The contents flowing through the wells at high pressure can be either flared or vented. In January 1999, the EUB collected data from 2,695 deliverability tests and found that fifty-five percent of tests were flared, sixteen percent were vented, and twenty-eight percent were conducted in pipelines. When flared or vented — which accounts for seventy-one percent of procedures — tests lead to excessively high ground levels of gases and vapours, many of them toxic as outlined previously, and thus potentially harmful to human and animal health, and detrimental to local vegetation including crops (EUB Guide 40 May 1999, p.2). Continued widespread use of well-test flares at significant durations is in many cases unnecessary, since new well-testing technologies can substantially reduce the length of tests. Well tests can also be conducted within pipelines when a well is connected to existing lines, thus reducing the need to increase local pollution from well-test emissions (Severson-Baker, Marr-Laing 1999, pp.5-6).

Glycol Dehydrators and Benzene: No Safe Exposure

Glycol dehydrators are a source of harmful emissions and have emerged as an issue of animosity between residents and industry in rural regions due to their release of the cancer causing carcinogen benzene. In 1994, benzene was defined in the Canadian Environmental Protection Act (CEPA) as a toxic substance, primarily due to its role as a cancer-causing agent. The main route of exposure to benzene is through inhalation, which leads to absorption in the bloodstream. This process can be toxic to bone marrow and may produce blood disorders such as anemia and leukemia. Intensity, frequency, and duration of exposure increases the likelihood of developing a benzene-related illness, although epidemiological studies have established a link between low-dose exposure and the development of certain types of leukemia (CAPP Nov, 1997, pp.3-4).

Glycol dehydrators are found in the vicinity of producing gas reservoirs in order to remove water from natural gas. Water is extracted from the gas to make it marketable and to prevent freezing and corrosion of pipelines. Dehydrators run natural gas through glycol, which absorbs the water and thus separates it from the flow of gas. Benzene, which is found in the natural gas, is also absorbed by the glycol. Once the water has been removed from the gas, it is boiled in a mixture containing glycol and benzene. The vapours from this process are then vented directly into the atmosphere (CAPP 1999, p.6). If emission-control devices are not installed on the glycol dehydrators, as much as ninety to ninety-

nine percent of the benzene contained in the gas will be vented into the atmosphere.

There are over 4,300 glycol dehydrators operating in Canada with ninety-nine percent of these found in the western sedimentary basin (northeast British Columbia, Alberta, and Saskatchewan) and eighty percent of the total located in Alberta. The vast majority of dehydrators are located in rural regions, close to gas wells and gathering stations. According to statistics supplied by the Canadian Association of Petroleum Producers (CAPP), fifty-two percent of glycol dehydrators do not have any emission control devices installed. An additional twelve percent of these are using inefficient forms of emission controls such as above ground holding tanks (eight percent) and underground storage (four percent). Most dehydrators are located more than seven hundred and fifty metres from the nearest home or public building; however, seven hundred and thirty one units are found within this distance of residences or public facilities. It is easy to imagine how seven hundred and fifty metres or less may be perceived by people living within that zone as an uncomfortable distance of separation from a facility directly emitting a cancer causing substance with no safe exposure levels (CAPP 1999, Status Report, pp.i,ii,iii).

Due to the high probability of human exposure to benzene, Environment Canada encouraged the gas industry to significantly decrease emissions from glycol dehydrators. After two years of hotly debated negotiation with a multi-stakeholder task force, the oil and gas industry reached a voluntary compliance agreement in 1997 in which emission reductions were targeted at ninety percent

below 1995 levels for the year 2005. By 1999, the oil and gas industry had reduced benzene emissions from glycol dehydrators by fifty-four percent, well in excess of the thirty percent target for that year (CAPP 1999 Status Report, p.iii). This is undoubtedly an important achievement, however, optimism should be tempered somewhat by the fact that there are no concrete plans in place to reach the ninety percent target by 2005. Moreover, a ninety percent reduction probably does not provide a complete sense of comfort to those living in close proximity to dehydrators, since, as I mentioned, there are no safe exposure levels to benzene (Severson-Baker, Marr-Laing 1999, p.7).

Failures, Ruptures and Leaks: The Hazards of Aging Infrastructure in an Era of Deregulation

Unanticipated releases of vapours and gases can occur from wells, pipelines and storage tanks. Among such releases are gas well-blowouts, discussed in detail earlier in the Lodgepole section. However, of growing concern are ruptures, leaks and consequential spills from pipelines due to the combined factors of inadequate regulation and inspection, and growth in the province's pipeline network, which is presently in the neighbourhood of three hundred thousand kilometres. This pipeline system is also aging, with many lines being over forty years old. According to EUB data, from 1980 to 1997 there was an average of six hundred and seventy-four pipeline failures per year (EUB Pipelines 1998, p.1). Those averages increased during the 1990s, with the twelve-month period running April 1999 to March 2000 recording eight hundred and sixty failures. That is well over two failures per day. Seventy-four percent of

these incidents were due to corrosion, which is commonly associated with inadequate maintenance and aging pipelines. Also in that same year, the EUB recorded that sixty-four percent of the pipelines it checked were unsatisfactory, rising twelve percent over the previous year (Hryciuk Oct 10, 2000). These figures, in conjunction with inadequate inspection of pipelines due to EUB funding shortages during the 1990s, have exacerbated fears felt by rural residents and activists about the integrity of the provincial pipeline network.

The accumulation of small leaks can lead to substantial environmental impacts on vegetation, crops and water sources, and substantial human and animal health impacts. And though most pipeline failures involve leaks with rather limited discharges, there are also numerous major incidents each year. Major ruptures are a significant public safety and health concern, with potentially lethal ramifications. For instance, according to a report released in 2000 by the General Accounting Office (GOA) during the years 1989 to 1998, pipeline accidents killed an average of twenty-two people per year in the United States. On August 19, 2000, an explosion from an underground pipeline incinerated twelve members of a vacationing family camping near Carlsbad, New Mexico. This incident came on the heels of a pipeline failure a year earlier in Bellingham, Washington, in which two young boys and a teenager playing on the banks of a creek were killed by a roaring ball of flame emanating from a pipeline explosion (Lazaroff June 16, 2000).

The Bellingham incident occurred two months after the House Commerce Committee had voted against making changes to the American national pipeline

safety laws due to heavy pressure from the oil and gas industry to renew the existing pipeline safety legislation that was soon set to expire (Paulson July 23, 1999). These events fueled intense scrutiny of the national pipeline safety legislation and regulatory practices. Such attention led to reports of lax enforcement of safety standards and inadequate inspection by regulatory authorities of an aging pipeline system prone to failures. As a result of intense pressure for changes to the national pipeline safety legislation the senate passed a bill in September 2000 which required more frequent safety improvements and steeper fines for failure to comply with regulatory standards (Lazaroff Sept 8, 2000).

The large and growing number of fatalities from pipeline incidents in the United States and media coverage of major accidents there, combined with revelations of inadequate inspections and enforcement, has encouraged some activists in Alberta to take up the issue of pipeline safety. Alberta's pipeline network is aging (many lines are over four decades old) and the deregulatory changes implemented in the 1990s (discussed in detail in the following chapter) have resulted in minimal inspection of pipelines in an era of vast expansion of the province's pipeline network. Corrosion (which is more likely to occur on aging pipelines) is the major cause of pipeline leaks with rates of such incidents increasing (EUB 1998, p.2). Alberta's history is also not without major pipeline incidents. Particularly notable was an incident that occurred on March 2, 1979, in a subdivision under construction in the huge southeast Edmonton community of Mill Woods. The failure occurred on a major pipeline right-of-way, when a rupture

resulted in the eruption of highly flammable liquid propane that had seeped through fractures in the pavement and ground. The escaping propane gas formed a pond and then began travelling in a huge cloud at the rate of one hundred metres per minute. At just after noon, a truck drove into the gaseous cloud, immediately igniting it, thereby causing the atmosphere to burst into flames in an area encompassing approximately 10.7 acres. The driver escaped from his vehicle and miraculously survived, but endured significant burns to his skin. The fire at the rupture site burned for sixteen hours before being brought under control, while fires in ditches and underground cavities burned for a number of days. Trees, along with street and sidewalk paving were damaged while propane traveled thirteen kilometres through the storm sewer system causing explosive conditions along the way; this necessitated the evacuation of nineteen thousand residents (ERCB 1979, p.16-18). Phil Hanneman, a consultant who assists landowners with claims against industry, is concerned that the same pipeline right-of-way, which is presently running through a community with eighty thousand residents and directly under public spaces such as a Sikh Temple and schoolyards, poses an unnecessary public safety risk (interview, telephone, March 7, 2001).

Spills and pipeline leaks can seriously damage agricultural operations by stimulating health complications in livestock and contributing to pollution of soils and groundwater. In 1998, after Martha Kostuch requested access under Freedom of Information legislation to a study entitled *1994 Livestock Field Investigations of Two Ranches Associated With a Pipeline Break*, the research

results were released to the public. This study looked at the effects of three pipeline spills into the Red Deer River on cattle found on two ranches on the banks of the river. The spills dumped crude oil, natural gas and sour gas into the water. The study's authors found respiratory and neurological damage in both herds and an increased occurrence of death. Calves in these herds were also found to be susceptible to infection and they exhibited a failure to nurse in conjunction with slow weight gain. Farmers who suffer the impacts of spills such as these often have their problems amplified by clean-up operations that can take many years, and landowners likewise often do not receive fair and adequate compensation from companies (Severson-Baker, Marr-Laing 1999, p.8,13; Calgary Herald Jan 14, 1999).

Well and Pipeline Abandonment

When pipelines and wells are not currently operational measures should be taken to ensure that they do not become an environmental and health hazard. Well and pipeline abandonment are processes that if not conducted properly can result in significant soil and groundwater contamination. In the case of wells if they are improperly plugged hydro-carbons can leak into surface and groundwater sources. Companies do not always plug the well hole because they may decide to operate it again in potentially more favourable economic conditions. As pertaining to both wells and pipelines a company may also simply want to avoid abandonment and clean up costs (Marr-Laing, Severson-Baker 1999, pp. 10-11, Griffiths 2001, pp.45-46). If pipelines are not properly

abandoned over time corrosion can lead to leaks and spills, which damage soils along with surface and groundwater. Companies may try to avoid incurring the considerable expense involved with properly disposing of decommissioned pipelines.

Due to the quasi-voluntary nature of EUB regulations companies are required to reclaim the lease site where wells have been located, but there is no time frame within which such work must be carried out. Consequently there are approximately twenty thousand abandoned well holes in Alberta that have not been properly reclaimed. There are also numerous pipelines that have not been adequately abandoned. As a result the EUB and industry have set up an orphan well fund that helps finance proper abandonment and clean up costs for wells and some pipelines that are no longer operational (Griffiths 2001, pp.41-46; PASC 1996, p.3). This helps address the problem, but the number of improperly abandoned wells and pipelines still in existence in the province poses a significant environmental risk, particularly in rural regions.

Sumps: An Environmental Catastrophe in the Making

Storage, disposal, and treatment of oil and gas production wastes are processes with a great potential to contaminate soil, crops and groundwater sources. Drilling mud is used to assist in the drilling process by acting as a lubricant for the drill bit, and as a means of controlling the pressure levels of oil and gas in the reservoir being tapped (Severson-Baker Marr-Laing 1999, p.9). In Alberta, oil and gas companies are allowed to use toxic drilling muds containing

diesel and other hydro-carbon compounds. The EUB allows for the use of additional potentially toxic additives, such as corrosion inhibitors, foaming agents, bactericides, emulsifiers and numerous other chemical compounds. During the drilling process hydro-carbon compounds are also brought to the surface along with significant amounts of soil-contaminating salts and heavy metals (Griffiths 2000, p.19). The process of storing drilling muds in pits called sumps can thus cause substantial contamination of soils and groundwater sources, as the contents of the sumps seep into the surrounding earth over time. Sumps are usually located on the well-lease, on the landowners property immediately adjacent to the well-site (if approval has been granted by the landowner/occupant), or on crown lands (remote sumps). If the concentrations of toxic substances used in the muds are expected to cause environmental damage then toxicity testing is required before disposal. However, there are no required tests for potential toxicity that can result from combinations of additives. Also, if it is determined that the toxicity resulted from hydro-carbons, then regular disposal methods can be used. Companies can use drilling muds that contain non-toxic additives such as canola oil and mineral oil; however, these alternatives are often rejected in favour of toxic muds because of their expense (Severson-Baker, Marr-Laing, p.9).

Decades of storing drilling mud in sumps has led to a situation that some activists believe may lead to a full-scale environmental and economic crisis in rural Alberta. This is due in part to the fact that neither the EUB nor Alberta Environment has kept an inventory of the estimated hundreds of thousands of

sumps in the province. In other words, the exact location of many of them is not known. Numerous sumps are not being cleaned up because they have merely been abandoned or the drilling lease has been sold to another company. When a company purchases a lease where a sump has been used by the former leaseholder, it is not legally obligated to clean up the sump. Phil Hanneman and Mitch Bronnaugh, also a consultant who represents landowners/occupants in claims against industry, believe that the clean up costs for sumps could run into the billions of dollars and that the government will likely be forced to pay most of the final expense (interview, telephone, August 14, 2001; interview, Edmonton, August 15, 2000). Bronnaugh notes that sumps can be a huge liability for landowners because the real-estate value of their land will likely drop considerably if a sump is discovered on their land (interview, August 14, 2001) (For further clarification on the appearance, and in some cases invisibility of sumps see Fig.3 and Fig.10 at the end of the document).

The EUB allows a number of other practices in the disposal of oil production waste. Land treatment is the process reserved for those muds deemed toxic enough to warrant an approval by the EUB. This method is used when drilling muds contain significant amounts of contaminated drilling waste or high concentrations of salt. Treatment requires the utilization of a particular segment of land where the drilling waste can biodegrade and transform. Two other disposal methods include the spraying of waste onto soil and the pumping of liquid wastes onto land. Both of these processes rely on dilution into the

surrounding environment as opposed to the treatment of contaminants (Severson-Baker, Marr-Laing 1999, p.9).

Seismic Operations, Drilling, and Deforestation

Oil and gas exploration, in conjunction with road, pipeline and well construction, has a considerable impact on eco-systems in the province, through both deforestation and increased commercial and recreational access to formerly remote regions. In 1998, the results of a study commissioned by the provincial government on the boreal forest in Alberta found that “deforestation rates [in Alberta] match and exceed those reported for Amazonia from 1975 to 1988” (Johnsrude, Hryciuk June 23, 1998). Deforestation in the Brazilian Amazon during that period of time received international condemnation and became a *cause célèbre* of the growing environmental movement in the late 1980s and early 1990s. The boreal forest study identified the forestry industry and the oil and gas companies as the two major culprits of deforestation; both contributed to a situation wherein less than ten percent of the forest cover in Alberta remains in a relatively natural state (Johnsrude, Hryciuk, June 23, 1998). Fourteen thousand kilometres of new seismic lines are currently cut each year, with an additional twenty thousand kilometres of formerly cut lines cleared and re-opened. This results in dramatic losses of habitat for many species of plants and wildlife. The scale of pristine habitat necessary for large mammals is further reduced by the fact that seismic lines and access roads fragment much of the forest that does exist. Increased recreational access has also caused damage including the

collapse of many regional hunting and trapping economies (interview, Rimbey, August 19, 2000; Marr-Laing, Severson-Baker 1999, p.10).

Conclusion

As we have seen in this chapter, contrary to industry and government claims, the oil and gas industry has a profound environmental impact in the province. Flaring and venting of numerous hydro-carbon compounds in the atmosphere has increasingly become a health and environmental concern of significant proportions. Fugitive emissions and leaks from wells and pipelines, both operational and abandoned, are also common occurrences that adversely effect soil and water quality. The numerous polluting practices of the petroleum sector are not recent arrivals in rural regions of the province since many areas have been affected by oil and gas activity for half a century or more. However, the remarkable expansion of the industry over the past few decades has not surprisingly engendered increased scrutiny of its health and environmental impacts. The search for understanding the environmental effects of oil and gas operations and thus ways to potentially reduce their impact have been hampered by reluctance from government and industry to provide adequate funding for necessary research, particularly in the area of chronic low-dose exposures. This, in turn, has led some to question the petroleum industry's capacity to contribute legitimately to the public interest in Alberta.

5. Oil and Gas Regulation

Alberta's farmers' are now subsidizing natural gas production for consumers in the United States and Ontario by shouldering all the pollution costs. The Regulators and the marketplace are just failing ordinary people.

—Mike Sawyer, Interim director of the Citizens' Oil and Gas Council (Interview with Andrew Nikiforuk-special to the *Globe and Mail*, January 13, 1999).

Introduction

The structure of petroleum regulation in Alberta places oil and gas companies in an advantageous position in efforts conducted at resolving disputes with concerned residents. This stems in part from the separation of land titles into surface and subsurface rights which allows leaseholders (those who possess subsurface rights) the right to drill on land (surface and subsurface rights will be explained in greater detail below). Oil and gas companies also benefit from the regulatory emphasis of the Alberta Energy and Utilities Board (EUB) which has the mandate of facilitating development of the province's energy resources. It is very difficult for concerned residents to prevent a proposal for development brought before the Board. The most that residents can usually expect is for the Board to place conditions on the approval of an application, which may minimize environmental impacts. The impact of oil and gas companies has been accentuated during the past decade due to rapid expansion of industry and funding cuts to the EUB. This combination of factors has reduced the EUB's capacity to inspect companies and enforce regulatory standards. These changes in the province's regulatory environment have resulted from the implementation of the neo-liberal policies (low taxes and deregulation of business) encompassed

by the Conservative government's program entitled the "Alberta Advantage." The advantages of this policy platform are, according to the government, to accrue to Alberta residents via increased investment stimulated through a competitive tax policy, and the overall process of decreasing government interference in the realm of business. The government has also reduced the rate at which it collects royalties from oil and gas companies (Macnab et al. 1999, pp.3-4). Deregulation of the oil and gas industry has accentuated environmental problems in rural regions. This reality, in conjunction with reduced rates of royalty collection, has created the appearance that the current Conservative government in Alberta has diminished the importance of the public in its conceptualization of public interest.

Despite rhetorical concern about the alienation of Albertans from federal political decision-making, Conservative governments in the province have not always taken an activist role in defending the interests of all the province's citizens. Those who have expressed concern about the insensitivity of oil and gas companies to the environmental, economic, and human and animal health implications of industry activities have struggled enormously to gain government assistance in dealing with these issues. No provincial government in Alberta has ever established a reputation for vocal criticism of petroleum companies. Likewise, few initiatives have been implemented, despite the demands of many rural residents, to increase the monitoring and regulation of industrial activity. In fact, the substantial reduction in funding to EUB during the 1990s, and the resulting decline in the number of its field staff, has forced the Board to rely on self-regulation and self-monitoring by oil and gas companies. How the province's

regulatory emphasis shapes the efforts of rural residents to address health and environmental concerns stemming from petroleum industry activity is where this analysis now turns.

Surface and Subsurface Rights

Two sets of titles pertaining to parcels of land in Alberta—surface and mineral—are central to the regulations governing exploration and extraction of energy resources. The surface title (surface rights) grants ownership to the land's surface and the right to work the land. Mineral titles (subsurface rights) designate ownership of the minerals under the land and allow holders the right to explore for oil and gas. The vast majority of landowners in Alberta possess only surface rights to their land; this is due to the passage of the *Dominion Lands Act* in 1887 which stipulated that all minerals would be reserved for the Crown (Griffiths 2001, p.3). Since the government of Alberta gained control of the province's natural resources in 1930, it presently holds and manages all mineral resources in the province, with the exception of those possessed by a small minority of freehold mineral rights owners and those located underneath First Nations' lands (Richards and Pratt 1979, p. 110). Thus, most landowners in Alberta do not possess the petroleum resources that may or may not exist beneath the surface of their land (PCF Sour Gas 2001, p.9).

Due to this arrangement of dual ownership of surface and subsurface sections of land, the Provincial Department of Sustainable Resource Development and the small number of freehold mineral rights owners are responsible for the granting of mineral rights to interested oil and gas companies

(PCF Sour Gas 2001, p.9). After obtaining subsurface rights to a parcel of land, a company must obtain a drilling permit from the EUB before it can start drilling. In cases where drilling access has been denied by the landowner, a right of entry order from the Surface Rights Board is required before drilling can proceed. Prior to undertaking such drilling operations, companies possessing mineral rights usually send a surveyor to assess the best possible location for a well. It is the responsibility of the surveyor to notify the landowner/occupant (see Glossary under occupant) of its surveying plans, and the surveying company is liable for any damages that may be incurred. Any disagreements that may arise regarding compensation for surveying activities are dealt with through hearings held before the Surface Rights Board (Griffiths 2001, p11). Once having gained a drilling permit a company has the right to enter the surface of the land for surveying purposes (as specified under the Surveys Act; section 16) and the landowners or occupants cannot refuse entry unless they are willing to risk having the company take the matter to a hearing before the EUB (Surveys Act). The right to survey also applies to the selection process for pipeline routes (EUB, Guide 17—3, Oct, 2000).

When a company decides to undertake drilling operations, it must submit an information package to the landowner/occupant and all residents within a set distance of the proposed well. The company is required to include in the package information pertaining to the drilling proposal and anticipated impacts that may result from it. Such information packages must also include a letter from the EUB explaining the landowner's rights, and Guide 62: Responding to Public Concerns

about Oil and Gas Developments, along with Guide 17-2: Well Site Selection and the Surface Landowner. If the landowners or occupants do not want development on their land, or cannot agree to the terms of the proposed drilling lease, they are entitled to prevent access to their land. However, the right to deny drilling access is not absolute, since the company can ask that the matter be taken to a hearing at the EUB. At this stage, it is imperative that the landowners or occupants provide a convincing explanation of how the proposed development may adversely affect their rights, because the Board can—and often does—throw out such objections without holding a hearing. Once a hearing is initiated, it is also of vital importance that the landowners or occupants, along with any other intervenors (affected parties officially objecting to a proposed development), put together a strong case to argue the proposed development would cause unacceptable damages or would not be in the public interest. Landowners generally have a chance of securing a more favourable outcome from the hearing process if they have previously demonstrated a willingness to negotiate with the company (Griffiths 2001, p.10). This stems in part from the fact that the regulatory functions of the EUB are not designed to prevent development, but to ensure that potential negative impacts of development are reduced. In this respect, Greg Gilbertson, Chief Communications Officer for the Board states, that “if landowners simply do not want development on their land then problems may arise, and in such situations the regulatory process may create winners and losers” (interview, telephone, July 9, 2001). Very rarely does the Board rule against proposed developments, although it does often modify or attach

conditions to the proposals in order to help address the concerns of the intervenors (Griffiths 2001, p. 10).

The only situation in which landowners or occupants have an unchallengeable right to deny access to their land to energy companies is in the case of exploration. Companies conduct seismic operations (see glossary under seismic survey and vibroseis) or drill test holes to determine the possible existence of minerals underneath the surface. If access is denied to companies interested in conducting such activities they have no right to enter the land or to appeal the landowner's decision (*Exploration Regulation, section 7*). In most cases when companies ask permission to enter land, they shrewdly do not inform the landowner or occupant of their right to refuse access (Griffiths 2001, pp.4). It is also interesting to note in this context that the EUB Guide 17—2 does not mention that the landowner has this right. Moreover, it contains a subsection entitled "The company has the right to enter land to explore for minerals" (EUB Guide 17—2). This assertion seems to be designed to create confusion in light of the regulatory standards laid out in the Provincial *Exploration Regulation* which grant landowners/occupants the right to deny access to land for exploration activities. It demonstrates clear bias towards serving the industry's interests, rather than the landowners or occupants (*Exploration Regulation, Section 7*).

The denial of exploratory access may not keep energy industry activity off the land, since companies may eventually assess the presence of mineral resources through other means. They can do this by gaining access to neighbouring properties and conducting seismic operations there that may

determine the existence of mineral resources underneath the property where exploration access has been denied. This is most often achieved via directional (horizontal) drilling, which allows for access to an oil or gas reservoir without drilling directly on top of it. If such efforts indicate the presence of energy resources in potentially extractable amounts, the company can then exercise its rights to survey and subsequently drill on the land where they were initially denied exploration access (Griffiths 2001, pp.5). Thus, despite the landowner's/occupant's right to deny exploration access, the separation of land titles into surface and subsurface rights places landowners and occupants in a position of weakness regarding the approval of future energy industry developments.

EUB: Regulatory Functions

A number of governmental bodies are responsible for the regulation of the oil and gas industry in Alberta: the Alberta Energy and Utilities Board; the Surface Rights Board; Alberta Environment; Alberta Agriculture; the Department of Sustainable Rural Development; and Alberta Energy. However, the EUB is the official regulatory agency governing the energy industry, and it is the chief authority responsible for the monitoring of industry facilities and the resolution of disputes between residents (landowners or occupants) and oil and gas companies. However, the Surface Rights Board has regulatory responsibilities pertaining to right of entry orders for mineral exploitation, pipelines, telephone lines and power lines, as well as issues of compensation related to such

activities. Also important are the functions of Alberta Environment, which manages the conservation, reclamation, and contaminant remediation of energy industry sites (Griffiths 2001, pp.59-82). Like the EUB, Alberta Environment has seen its budget cut and staffing levels reduced during the 1990s, which has limited its ability to prevent and repair environmental damage (Gallon Feb1999, p.6). In this analysis, I will focus primarily on the role of the EUB, since it is the regulatory body of fundamental importance to rural residents concerned with addressing the implications and impacts of oil and gas industry activity.

The EUB is a quasi-judicial, independent body whose mission statement is "to ensure that the discovery, development and delivery of Alberta's resources take place in a manner that is fair, responsible, and in the public interest" (EUB online at <http://www.eub.gov.ab.ca/>). The Board is responsible for approving each and every oil and gas project before it can be undertaken. It is also within the Board's mandate to listen to and review objections to proposed developments before they can be designated as being in the public interest and subsequently granted approval. The Board sets regulatory standards to which the industry must comply and it is responsible for inspecting industry facilities and practices (Griffiths 2001, pp.59-60). Nonetheless, the Board's demonstrated reluctance to block development proposals, often despite widespread and concerted objections from landowners, occupants and other concerned members of the public, has led to considerable skepticism about the Board's ability to protect their interests vis-à-vis industry. Mitch Bronnaugh, a consultant who helps rural residents negotiate claims against industry, eloquently sums up such

sentiments by explaining, “ the EUB is not biased in its decisions, in fact it only acts as a rubber stamp ninety-nine point nine percent of the time” (interview, telephone, July 3, 2001) .

The Board places emphasis on its role as a facilitator of development. As explained by Greg Gilbertson “the EUB’s mission is the discovery, development, and delivery of Alberta’s resources, not their non-discovery, non-development , and non-delivery” (interview, telephone, July 9, 2001). Consequently, the Board rarely turns down applications for energy industry developments. However, the Board does attempt to make sure that such developments occur in a responsible fashion when they are initiated. It thus tries to ensure that appropriate safety measures are adhered to in the construction and operation of industry facilities. It also aims to ensure that a minimum of environmental impact occurs from the projects that it approves. In this vein, Bronnaugh qualifies his earlier assessment of the Board by explaining that, in his experience, companies are more reluctant to go through the process of a public hearing currently than they were in the past. Bronnaugh believes that there is a view emerging among members of industry that it has become more difficult for companies to secure a favourable outcome from a public hearing, because there is a much greater chance that the Board will attach conditions to its approvals now. He believes this situation stems in large part from the fact that rural residents are more aware of how to negotiate with companies, less intimidated by expert discourses often utilized by industry representatives, and generally not as frightened by the hearing process (interview Aug 14, 2000).

EUB: Legislative Powers

The responsibilities of the EUB are delineated in a number of key pieces of provincial legislation. Of utmost importance to regulation of the petroleum industry is the *Energy Resources Conservation Act* (ERCA). The ERCA defines the necessity for assessment of the extent of energy reserves in relation to projected demand. In this sense, it has the objective of ensuring conservation of resources through implementation of waste control measures. Conservation (in this context meaning the collection of resources for future use) is a familiar concern in the oilpatch, as demonstrated in the early years of regulation (or lack thereof) in Turner Valley. In fact, one of the chief tasks of petroleum regulation has historically been that of conservation of resources. However, the ERCA also lays out the need to ensure “safe production” and defines the need for pollution control during the processes of exploration, extraction, processing, and delivery of energy resources. The ERCA grants the EUB significant and wide-ranging powers for enforcement of these responsibilities, while also outlining how the Board operates. This includes the granting of powers to the Board for holding hearings, investigations and inquiries. Moreover, the Board must post notice of applications, and it possesses the capacity to make changes to or deny approval for development proposals. The Board also maintains the right to turn down applications from intervenors (members of the public) who file submissions for public hearings. The EUB has the ability, which it often exercises, to facilitate the resolution of disputes between members of the public and industry without

holding a hearing (Griffiths 2000, pp.62-63). In fact, as a first course of action for concerned landowners/occupants, the EUB recommends negotiating directly with companies rather than proceeding according to its formal dispute resolution protocols (EUB Guide 62).

The *Oil and Gas Conservation Act* specifies the appropriate practices for exploration, drilling, testing, and the operation and abandonment of oil and gas wells. It mandates measures for preventing pollution at, below, or above the earth's surface and grants the Board powers to issue well licenses and pipeline permits. This piece of legislation extends to the Board powers to prevent the escape of oil or gas and, in the event of an incident, undertake clean up operations. It also sets criteria for the financing of the Board. The *Oil Sands Conservation Act* and the *Pipeline Act* legislate similar powers to the Board in matters relating to these areas of energy industry regulation.

The Board publishes a wide range of guides explaining the process and requirements for the drilling of wells, laying of pipelines and the conducting of affairs related to surface rights issues. The Board, for instance, requires companies to give a copy of its *Guide 62: Responding to Public Concerns about Oil and Gas in Alberta* to landowners and occupants when they request access to their land. Companies must also hand out one of either *Guide 17-2: Well-site Selection and the Surface Owner* or *Guide 17-3: Pipelines and Surface Rights—A Guide for Landowners and Occupants*, depending on whether the proposal is for a well or pipeline. The Board also issues information letters describing new regulations.

The EUB's status as an independent body is somewhat precarious since it is part of the Department of Energy and must report to it. Similarly, members of the Board, including the chair, are appointed by the government. The Board also receives seventy-five percent of its funding from the energy industry, with the remainder provided by government. Concerned rural residents have pointed out that the high rate of industry funding to the Board places it in a conflict of interest position (Provincial Advisory Committee on Public Safety and Sour Gas Dec 2000, p.25). However, Gilbertson explains that the EUB position on this matter is that such high rates of funding are merely a form of taxation; imposed on industry because it should take the lion share of responsibility for financing the regulation of its own activities, rather than placing the burden on Alberta taxpayers (interview, telephone, July 9, 2001). Even if this is accepted as a fair justification for the existing means of funding the Board, the fact remains that the lack of funding since the mid-1990s has de-legitimized the assertion that industry is paying its fair share of regulatory costs.

The Alberta Advantage: Budget Constraints = Environmental Deregulation

Beginning with Ralph Klein's reconstruction of the provincial Conservative Party after being elected in 1992 on a platform of deficit reduction, government spending in the last decade has been reduced. This new concern with fiscal conservatism involved implementation of neo-liberal economic principles to government policy; a process termed the "Alberta Advantage." This term encompassed a set of initiatives that featured not only deficit reduction and

elimination, but also an aggressive program of budget cuts to virtually all government services, consequential large-scale privatization, and deregulation of business (Marr-Laing, Severson-Baker 1999, p.17; Klein 1999). The “advantage” to this approach to government was its promised potential to foster a more favourable business climate which would, the government argued, stimulate economic growth. Alberta has, in fact, experienced significant economic growth since the mid-1990s, but this has been fueled largely by a national economic upswing and rapid expansion of the North American market for Alberta’s reserves of natural gas in conjunction with a five-fold increase in the spot price of gas between 1997 and 2000. The steady increase of the West-Texas intermediate price of crude oil also contributed to a rapid expansion of the province’s oil industry, thus providing a further boost to economic growth in the latter years of the 1990s (Nikiforuk 2000, p.2).

Despite considerable expansion of oil and gas activity, the EUB and Alberta Environment were not exempted from the budget cutting processes necessary to the “Alberta Advantage.” Energy industry growth meant that the number of well applications reviewed by the Board increased from four thousand in 1993 to twelve thousand in 1997, which, then, led to a four-fold expansion in drilling activity. Energy industry expenditures on upstream activities (extraction, processing, and transportation of resources) increased by fifty-seven percent while the number of firms operating in the province reached one thousand two hundred, up from approximately seventy companies in the 1980s. Remarkably, during the years 1992 through 1998, the height of industry expansion, a twenty-

three percent reduction in funding occurred at the EUB. This translated into a nineteen percent reduction in staffing levels, with the majority of the cutbacks occurring in field staff positions (responsible for inspections). In fact field staff positions were reduced by sixty percent with actual in the field time for such positions that remained cut from seventy percent on average to thirty five percent (Severson-Baker Feb 1999, p.1; Marr-Laing, Severson-Baker 1999, p.17). During the same period, the Department of Environmental Protection (currently Alberta Environment) had its budget cut by thirty-one percent. That resulted in staffing reductions of thirty-three percent, which translated into the cutting of 1,550 full-time positions. These reductions were part of the government's commitment to cut provincial environmental regulations by fifty percent (Gallon Feb 1999, p.6).

In this atmosphere, the Board's ability to ensure that the exploration, development and delivery of resources occur in a fashion that is responsible to the environment and human beings has been seriously undermined. Since such drastic cuts to field staff have occurred at a time of remarkable expansion in the oil and gas sector, one of the EUB's key areas of responsibility, the monitoring of industry practices, has been severely strained. For example, eight inspectors specialize in the area of pipelines, yet the portion of Alberta's pipeline network under the EUB's jurisdiction is in the neighbourhood of two hundred and eighty thousand kilometres , and is expanding at around ten thousand kilometres per year (EUB 1998, pp.3-15; PCF Pipelines, p.5-9; Hryciuk March 27, 2000; Oct 10, 2000). If one adds to this the fact that Alberta's pipeline system is aging, with many lines forty or more years old, it becomes clear that such a small number of

inspectors have too much work to adequately monitor and enforce regulatory standards. Close to two-thirds of the pipelines investigated in random spot checks by the EUB in 1999-2000 were found to be operating in violation of regulations. According to the Board, one-fifth of new pipelines being constructed are violating regulatory rules. This situation contributed to the eight hundred and sixty pipeline failures (more than two a day) that occurred in the year 1999-2000 (Hryciuk October 10, 2000).

Environmental watchdogs and farmers' advocates have noted that field staff reductions have essentially led to a regulatory environment of self-monitoring by industry. They claim that this has resulted in voluntary compliance with regulatory standards by energy companies (Marr-Laing, Severson-Baker, 1999. P.19). The area of oil field waste treatment and disposal, which is very loosely regulated, provides some good examples of the EUB's lax regulations. Phil Hanneman, an advocate for landowners involved in disputes with industry, stresses the issue of sumps (storage sites for toxic drilling mud) to highlight the voluntary nature of regulation under the EUB. The EUB does not require companies to report the location or content of sumps and, consequently, it does not keep an inventory of such drilling mud storage sites, which are estimated to number in the range of two hundred thousand or more (interview, telephone, Aug 14,2000); interview, Rimbey, Aug 19, 2000). Hanneman believes that companies should be responsible for cleaning up such sumps, due to their potential to pollute both the land surface and subsurface and seep into sources of groundwater used by rural residents and their livestock. Hanneman asks "Why

isn't that a priority? Why isn't that the price of doing business in Alberta? What will it cost to clean up one day" (Hanneman in Staples July 23, 2000, E8)

Similarly, in a 1999 article "The Downside of Downsizing: Lessons from the AEUB," Chris Severson-Baker of the Pembina Institute points out that an excellent example of voluntary compliance is provided by the case of road burial of oilfield waste. Severson-Baker refers to the specific example of the Bonnyville-Cold Lake region, where the EUB had been allowing companies to dispose of stockpiles of oil field waste accumulating from significant expansion of the region's heavy oil industry. The EUB decided to permit companies to bury oilfield waste directly into public roadbeds without first conducting environmental and public assessments of the practice. At a public hearing initiated by concerned area residents—which was held a couple of years after approval had been granted—it was discovered that not only did the EUB not have regulatory guidelines for the practice of road burial, but it had also not yet conducted assessments of its environmental impact (Severson-Baker Feb 1999, pp.3).

The EUB counters criticism of its regulatory performance by arguing that budget constraints have caused it to implement innovative approaches to regulation. Greg Gilbertson draws attention to the program the Board implemented in the mid-1990s, which was designed to allow it to accomplish more effective and efficient regulation and enforcement with fewer resources. This strategy is referred to by the acronym OSI (which translates as "operator history, site-sensitivity inspections"). Key to this approach is its requirement to conduct problem-specific inspections which focus on companies with a history of

failed adherence to the Board's standards (hence the "O" for "operator history"). By doing so the Board can channel resources toward assessments of repeat offenders, who presumably cause the greatest environmental damage. The Board expects that it will receive assistance in identifying problem companies and facilities from members of the public who monitor and then complain about impacts. It should be noted that the Board does respond to most complaints it receives. This approach has required it to implement escalating enforcement ladders (EUB Informational Letter IL 99-04) which target repeat offenders with more severe penalties, potentially culminating in extreme cases where revocation of operating licenses for given projects and or facilities may, and actually does, occur. Focusing inspection on those companies with a history of regulatory non-compliance has been the basis by which the Board has eliminated the previous requirement of conducting reviews for every energy industry application (interview, telephone, July 9, 2001; Provincial Advisory Committee on Public Safety and Sour Gas Dec 2000, p.21).

The site-sensitivity section of the acronym (operator history site-sensitivity inspections) refers to the targeting of specific types of energy industry projects for more severe regulatory standards and rigorous inspections. For example, critical sour wells (see glossary), which pose a more significant environmental and public risk than most other projects, would fit into this category. By concentrating regulatory attention on such activities, the Board believes it can more effectively monitor and control the industry in key high risk areas, despite the challenges posed by industry expansion and low levels of funding (interview, telephone, July

9, 2001). Unfortunately, part of the Board's strategy to cope with limited resources has been to eliminate the former practice of working with industry to design and implement environmental protection measures. Consequently, companies may no longer have easy access to essential sources of information which can help them respond to incidents more efficiently and rapidly and would increase the likelihood that preventive practices to environmental protection are followed (EUB Informational Letter IL 99-04; Severson-Baker 1999, pp. 18-19).

There has been significant criticism of the EUB's efforts to work more effectively in an era of limited operational resources. In their 1999 study *Beyond Eco-terrorism: The Deeper Issues Affecting Alberta's Oilpatch*, Chris Severson-Baker and Tom Marr-Laing argue that the OSI system of regulation and enforcement could work in theory, but the extent of the budget and staff cuts, and the rapid nature in which they were imposed, have meant that the Board has not had the time or resources to implement the new system effectively (Marr-Laing, Severson-Baker 1999, p.19). Perhaps this is true, but it seems that EUB's emphasis on regulatory efficiency and the rhetoric of doing more with less avoids admission of the fact that OSI is essentially a policy of deregulation. For instance, by focusing more attention on problem-specific inspections and escalating enforcement ladders, the EUB has sent a fairly strong message to many companies that it will not closely monitor their activities. Moreover, should it be discovered that there are problems with how such companies are operating the consequences will not be severe. The Board has thus essentially created a

system of voluntary compliance for the numerous companies that are not considered to have a poor environmental track record.

In this regulatory environment, it is to a considerable extent the responsibility of landowners, occupants, and other concerned parties to monitor the health and environmental impacts of oil and gas companies. Chris Jensen, a veterinarian and livestock producer in Central Alberta, points out in a report to the Clean Air Strategic Alliance (CASA) Animal Health Workshop that "it is the livestock producer who has to prove a damaging effect rather than industry testing and controlling emissions to limit their impact on livestock production" (CASA Nov 29-30 1999, p.67). For the most part, the EUB conducts testing of environmental impacts of emissions from specific facilities only after residents express concern and subsequently ask for monitoring to take place. Jensen explains the implications of the EUB's regulatory approach to livestock producers:

It is long past due for industry and the controlling agency (EUB) to get serious about a wasteful process that has a serious effect on animal life and contaminates the environment. It is close to impossible, both statistically and financially, for livestock producers to maintain the records required and rule out all the other possible causes of disease process in order to convince the legal system that waste products from flaring are the cause of the problem. Industry must reduce and stop flaring until they can prove no harmful effects (CASA Nov 29-30, 1999, p.69)

Interestingly, in an era of rapid expansion of petroleum industry activity in close proximity to population centres, and a growing awareness among rural residents of the animal and human health effects of exposure to sour gas flaring, the EUB is relying on the monitoring of industry impacts by concerned individuals. This

situation has many rural residents asking why the EUB cannot set serious regulatory standards that industry must adhere to and why all companies cannot be forced to meet these emission levels through regular inspections from EUB field staff. Severson-Baker and Marr-Laing capture the ominous implications born by the frustration underlying such questioning by explaining that “experiencing a dramatic growth in bad practice and pollution in the field and a loss of regulatory presence first-hand, the public’s already limited faith in the government to act to protect their interests has evaporated” (Marr-Laing, Severson-Baker 1999, p.19). Phil Hanneman expresses the lack of faith that has emerged from the EUB’s current regulatory approach in reference to pipeline inspections stating “the companies say that their pipelines are safe. But we’re told if we smell anything or see our cows drop dead, give them a call. We’re considered their first line of defence” (Hryciuk March 27, 2000).

Although the EUB has received funding increases in the past two years resources and staffing levels are not perceived by many of those affected by oil and gas developments to be sufficient to ensure adequate environmental protection. Such concerns seem warranted, since funding levels to the Board have not yet exceeded what they were in the early 1990s, despite the significant expansion of the oil and gas industry which occurred during the decade. Thus the number of positions that include field inspection responsibilities for all aspects of industry activity have only risen from a low of ninety in 1998 to approximately one hundred and ten presently (Griffiths 2001, p.59; interview, telephone, July 9, 2001).

The recent increases in funding to the Board are typically explained by the successful elimination of the deficit in Alberta in conjunction with a slight tempering of the global zeal for deregulation and neo-liberal economic policies in the past few years. However, two comments must be made on this matter. First, this explanation does not give adequate credit to the effect that concerned rural residents may have had in alerting government, industry and the EUB of the need to acknowledge their concerns (even if such recognition elicited steps that fall far short of what has been demanded). Second, the spending increases have not resulted in the implementation of regular inspections and substantial enforcement of regulatory standards. Therefore, it is still essential to assess the relationship between industry, the EUB, and government, as well as the relationship between how the low levels of funding to the Board and the structure of its regulations fit with the approach to governing termed the "Alberta Advantage."

The Board is a regulator with the function of monitoring the practices of industry while it also acts as an apparatus for dispute resolution for conflicts that arise between industry and landowners/occupants. Many activists who have experience with the Board place emphasis on the fact that it employs numerous people who work diligently to uphold the Board's ostensible responsibility as a neutral regulator sensitive to the public interest in matters related to oil and gas activity. Nonetheless, the essential role that the petroleum industry has played in stimulating economic growth in Alberta has generally resulted in the Board situating the perceived interests of the petroleum industry at the centre of its

decision-making processes. In other words, the Board has often acted as a mechanism to ease the expansion of the industry and allow it to operate at maximum profitability, regardless of the implications to the environment or health of Albertans. This trend is accentuated by the fact that the Board has its members appointed by, and is directly answerable to, a government that is very supportive of the petroleum industry and its expansionist aims. Also many of the EUB's staff have come to it from positions in industry. It can be assumed that these employees have been exposed to an environment that encourages enthusiasm for resource industry expansion and adherence to the profit motive as a way of carrying out their responsibilities. Chris Jensen explains the regulatory dynamic that he believes emerges from these trends:

In the past, the Government of Alberta (members of the legislative assembly) were very closely and/or directly attached to the oil industry. Many of the people in the ERCB/EUB are direct transplants from the industry with the head office just down the street from industry boardrooms. Civil servants responsible for administering the related Acts and Regulations do not enforce them for fear of lack of support from above, with the potential loss of employment (CASA Nov 29-30 1999, p.67)).

As Jensen points out, it is not only employees at the Board who are close with industry. There is also a history of close and direct connections between members of the provincial Conservative government and the oil and gas industry. This is not something confined to the past either; it is very much a current reality, as was revealed in 1997 when the provincial ethics commissioner, Bob Clark, informed the *Edmonton Sun* that he had privately warned a number of MLAs of the conflict of interest problems that could potentially arise from their personal ventures in the province's oil and gas industry. Clark was responding, in part, to

the fact that seven Conservative Party MLAs had formed a private oil corporation code-named Tory Oil. His comments earned him steady condemnation from John Havelock, then head of the province's financial planning committee and the driving force behind the formation of Tory Oil. Havelock demanded an apology from Clark, who granted one shortly thereafter, but the dispute served to draw attention to the fact that, for some members of the provincial government, close and amiable relations with the oil and gas industry go well beyond shared ideological outlooks and a recognition of the contribution of the energy industry to the province's economic prospects (Laird 2000, p.2).

The same government that has members with direct ties to the petroleum industry is also responsible for the series of economic and governmental reforms termed the "Alberta Advantage." The "Alberta Advantage" has been bound up with Ralph Klein's reinvention of the provincial Conservative Party and has established him as a national poster-boy for the wonders of free-market, deregulatory economic policies. The "Alberta Advantage" was on one level a heightening of the tendency to conceptualize the public interest in economic terms. Deficit elimination was promoted as a panacea for the sluggish economic environment of the early 1990s. This goal took on a near mystical quality, causing fiscal responsibility to become almost an end in itself for the government and much of the business class in the province. Now that the deficit has been eliminated, the government has maintained this strategy by focusing its efforts on eliminating the debt, which is similarly seen as a goal in the best public interest. Yet deficit and debt elimination have also been used to justify the implementation

of a new approach to government which de-emphasizes the provision of social services and reduces the regulation of business. The sacrifices made in the effort to reduce the deficit were thus placed almost entirely on the backs of public servants, students and employees and clients of social programs (health-care and education etc.), and meant a decline in environmental regulation and protection (Klein March 1999). Severson-Baker and Marr-Laing explain the rationale of this set of policy initiatives with specific reference to their impact on the EUB and Alberta Environment:

Such downsizing was driven in part by the public imperative to eliminate the province's deficit, but also the narrow political ideology that regulating industry's compliance with environmental protection measures would impede economic growth. Ignoring the fact that "sustainability" can only be achieved by keeping the economy, society, and the environment *all* healthy at the *same time*, the government limited its focus to "economic sustainability (Marr-Laing, Severson-Baker 1999, p.17).

On another level, the new approach to governing practiced by the Conservative government under Ralph Klein's leadership has gone beyond conceptualizing public interest exclusively in reference to economic considerations and has defined it more strictly in relation to the interests of the dominant economic forces in the province. This, along with the more general narrowing of public interest down to economic considerations, is related to the international zeal of governments globally for low corporate tax rates, privatization, deregulation, and spending cuts during the 1990s. However, in Alberta these initiatives were not only seen as reformist and thus innovative; they were to a certain extent implemented as a return to what was perceived by many

as more secure methods of economic management. This stemmed in large part from the belief that the previous Conservative administration, under the leadership of Don Getty, had practiced a dangerously interventionist form of governing that included extravagant spending on new rural hospitals, overly generous social programs and too much government funding of economic diversification schemes, some of which eventually failed (Gitter 1999)⁹. There was a strongly felt sentiment in the province that such mistakes should not be made again and that Alberta should go back to managing its affairs in a fiscally safe and responsible matter (Gibbons April 1996, p.3). This resulted in a reduction in social spending and a reluctance to engage in government support of economic diversification into other sectors such as high tech etc. Consequently, the old reliance on oil and gas was re-embraced, and the province's natural resources were seen in a new yet familiar light, as a natural endowment and economic blessing. Although startling it is not surprising that Alberta is now twice as dependent on the resource sector for government revenues as British Columbia, a province commonly associated with natural resource development (Klein March, 1999).

The years since the Klein administration entered the legislature in 1992 represent a new stage in the relationship between Conservative government and the petroleum industry in Alberta, characterized by an even stronger influence of

⁹ Don Getty's government (1985-1992) oversaw the collapse of a number of major companies whose debt was guaranteed by the government. Notable among these were Gainers, Novatel, Principal Savings and Trust, and a magnesium plant in High River. Hundreds of millions of dollars were lost on these companies with the \$650 million lost on Novatel, the provincial cell-phone company, causing it to become a metaphorical symbol for the supposed folly of government directed economic diversification schemes (Gitter 1999).

the sector on government policy. There is certainly no denying that the Lougheed government had a close and amicable relationship with the oil and gas sector, yet there is a substantial discrepancy between the lengths to which it required industry to contribute to the public interest and those expected by the current government. This becomes more apparent through an assessment of the royalty rates the Lougheed government charged industry in comparison to those being levied by the current administration. In *Giving Away the Alberta Advantage: Are Albertans Receiving Maximum Royalties for Their Oil and Gas*, a comprehensive study of royalty rates in Alberta historically and in relation to other oil producing jurisdictions, Macnab et al. (1999) make some revelations about the changes in the royalty regime under Ralph Klein's administration. A royalty is a payment to the owner of a non-renewable resource for its extraction. Royalties are paid to private owners for depletion of their resources. The Alberta government collects royalties because it owns most of the province's subsurface resources.

Lougheed's government (1971-1985) collected an average of \$4.67 barrel-of-oil equivalent (boe) in constant 1996 dollars, while under the Klein government between 1992 and 1997, the average royalty rate was 2.10/boe. This translates into less than half as much received in oil and gas revenues per unit of oil under the Klein government. If the Klein administration had continued collecting royalties at the rate of the Lougheed government then Alberta would have collected an additional \$3.78 billion dollars annually between 1992 and 1997. By comparison, the total health care budget per year was \$3.96 billion during the

same period; health care was one of the major areas to receive substantial funding cuts during the 1990s (Macnab et al. 1999, p.3-4).

To illustrate how such reductions in royalty charges were not a necessary response to a changed economic environment during the 1990s Macnab et al. (1999) compare royalty rates charged during the same period in Alaska and Norway, both oil-producing jurisdictions. Alaska and Norway were chosen for comparison because they are both high cost producers with a significant non-conventional (in Alberta this essentially means oilsands or heavy oil deposits) emphasis, like Alberta. Alberta's average revenue derived from oil and gas royalties and taxes of \$2.41/boe from 1992 to 1997 compares to \$3.74/boe in Alaska and \$6.41/boe in Norway during the same period. Alberta's rate of revenue collection for 2000/2001 was forecast to decline to \$1.25/boe, while Norway's was predicted to grow to \$12.42/boe. Also of significance to the public interest are the levels of revenue secured in petroleum savings funds in these jurisdictions. Alberta—by far the largest petroleum producer of the three—had \$12 billion in its Heritage Savings fund in 1997, Alaska had \$40 billion in its Permanent Fund in 1999, while Norway had \$29.4 billion in its Petroleum Fund in 1997. This places Alberta in a potentially more vulnerable position than both Alaska and Norway should the market for petroleum resources decline in the future, or if its oil and gas reserves diminish significantly. It is important to note that Alaska and Norway have retained viable and indeed healthy energy industries during these years, thus it does not appear that their higher rates of

revenue collection have hurt their respective petroleum sectors (Macnab et al. Nov 1999, pp.3-4).

A relevant question to ask is: if the government is not willing to charge oil and gas companies royalties at maximizing rates on the resources that Albertans own, then how can deregulation of environmental protection pertaining to the petroleum sector be construed as a means of contributing to the public interest? A short answer is that since both government and industry finance the board they would both save resources by decreasing financing to it. However, a broader explanation, which encompasses the above answer, must point out that the current provincial government views profitability in the petroleum sector and the public interest as being essentially one and the same thing. The above comparative assessment of royalty rates suggests that the current provincial administration is quite willing to implement policy that is exceedingly, if not exclusively, favourable to the oil and gas industry. Seen in this light, the reduction of funding to the EUB and the consequential reorientation of its regulatory framework to de-facto voluntary compliance can be viewed as implicit in and compatible with an overall strategy of government practiced by the Conservative government since the mid-1990s which places special emphasis on enhancing the profit margins of the petroleum industry. Like royalty reductions, inadequate and non-comprehensive regulatory standards, along with decreased inspections of facilities and limited enforcement of regulations during a period of rapid industry expansion, represent an adherence by the provincial government to a view of the public interest founded almost exclusively on maximizing profitable

development of oil and gas resources. In the words of Severson-Baker and Marr-Laing, "in every sense, the 'Alberta Advantage' meant getting government out of the way of business, regardless of collateral environmental or social costs" (Marr-Laing, Severson-Baker 1999, p.17) In this view, the "Alberta Advantage" is seemingly more advantageous to the profit forecasts of oil and gas companies than it is to the maintenance of environmental integrity or the personal health and economic prospects of rural residents who conceptualize public interest in terms broader than the immediate aims of the petroleum sector. It is thus not mere coincidence that rural frustration with and resistance to oil and gas activity has resurfaced in recent years.

Understanding how the emphasis by the provincial government on facilitating profitability and expansion in the petroleum sector has become so accentuated requires further assessment of the system of mineral ownership in Alberta. Even though the provincial government is not charging maximum royalty rates on its petroleum resources the collection of royalties from oil and gas companies has allowed the government to implement the "Alberta Advantage", particularly the tax cuts implicit to it. Thus ownership of the majority of the province's mineral rights has given the government the opportunity to follow a course of governing that would be far more difficult to adhere to in most other petroleum producing jurisdictions without also increasing royalty rates charged to oil and gas companies. In Manitoba and Saskatchewan, for instance, farmers historically received title to mineral rights along with the title to their land. In Alberta only those farmers who settled their land prior to the province's entry into

confederation received mineral title to their land. Interestingly, during the late 1940s there was a movement launched to encourage the Social Credit government to hand its crown-owned mineral rights back to farmers as a means of allowing them to reap similar economic benefits to those of farmers in other oil producing regions. In 1947, the following very Jeffersonian populist warning regarding the implications of allowing the government to retain majority ownership of mineral titles appeared in the pages of the Calgary based *Farm and Ranch Review*:

A government that had to come to the people every year for every dollar it spent would be responsive to the wishes of the people. A government that through oil income, could get along without taxing authority would be unresponsive to the people and might ultimately become dictatorial (Richards and Pratt 1979, p.157).

The 1990s were a decade in which the provincial government required the people of Alberta to make sacrifices in order to alleviate financial problems, particularly the deficit (presently emphasis is on the debt). Thus the current deregulation of industry and seeming inability of the Conservative government to consider requiring the petroleum industry to contribute to the public good in any way beyond pursuing profitable economic expansion seems to suggest there was some validity to the fears communicated by the populist editors of the *Farm and Ranch Review* over half a century ago (Richards and Pratt 1979, p.157).

Conclusion

Regulation of the petroleum sector in Alberta is shaped by the goal of facilitating the development of energy resources. Consequently the emphasis of

the EUB is on encouraging development that is environmentally and socially responsible and thus in the public interest. In this definition, however, public interest is conceptualized in terms of economic growth through resource extraction, processing and transportation to markets. Some landowners or occupants do not see benefits accruing to themselves from oil and gas developments on or near their land and are, moreover, concerned about the possible economic, safety, health and environmental implications of industry projects. However, the mere act of opposing resource development is contradictory to the definition of public interest that informs the mandate of the EUB since its role is to encourage such development. Thus there are substantial limitations to what concerned rural residents can accomplish through the regulatory procedures set up by the Board. For instance, many residents in the province, rural and urban, are terrified by the prospect of sour gas developments occurring in close proximity to their homes and communities. Therefore even the installation of emission control devices on flares etc. are not particularly reassuring measures.

Perhaps more distressing for those skeptical about the impacts of oil and gas developments, however, is the effect that funding shortages and consequential deregulation of environmental protection has had on the ability of the EUB and Alberta Environment to inspect industry and enforce regulations. The eight hundred and sixty reported pipeline incidents which took place last year and the EUB records indicating that more than fifty percent of operators are not satisfactorily adhering to proper regulations is more than somewhat

disconcerting to those living in close proximity to a pipeline right of way.

Moreover, many practices that accompany oil and gas development such as flaring, venting, and land-spreading of toxic drilling mud are sanctioned by the EUB and Alberta Environment even though Albertans are increasingly aware of the damaging environmental and health impacts of such practices.

6. Sour Gas, Rural Frustration, Sabotage, and Wiebo

South Peace Country: Community in Transition

Prior to the late 1990s, few people outside of Alberta were familiar with sour gas: its impacts on the environment, on human and animal health, and just how contentious an issue its extraction and processing was in many oil-patch communities. That all changed during 1997, when reports of high levels of industrial sabotage against oil and gas facilities in north-western Alberta began appearing in the media. At around this time, the media also started focusing on the claims made against industry activities by Wiebo Ludwig, an organic farmer and former Christian Reform Minister. He claimed that gas companies were poisoning the 35 members of his Fundamentalist Calvinist communal family and the livestock on their ranch outside the community of Hythe in the north-western part of the province. Ludwig's fiery and confrontational personality attracted media attention and he rapidly became a household name throughout Canada. On January 15, 1999, Ludwig and fellow Trickle-Creek commune member Richard Boonstra were charged with nine counts of mischief and conspiracy related to offences against industry facilities. In April, 2000 Ludwig was sentenced to a twenty-eight month jail term on five counts of oil-patch vandalism with Boonstra receiving a 21 day sentence for one count of mischief (Vitello, April/May 1999; Sheremata April 28, 2000).

The events surrounding Wiebo Ludwig which unfolded during the late 1990s are significant to this analysis because they caused the media, industry, and provincial politicians to pay closer attention to oil and gas disputes in rural Alberta. For instance the Alberta Energy Company (AEC) set up an ombudsman in order to deal with farmers' concerns as a result of its disputes with Ludwig. Similarly, a number of multi-stakeholder groups responsible for addressing issues related to oil and gas practices including the Clean Air Strategic Alliance (CASA) and The Provincial Advisory Committee on Public Safety and Sour Gas have been set up by the Alberta Energy and Utilities Board (EUB) and the provincial government since Ludwig began appearing regularly in the media. The Ludwig affair also illuminates the extreme social tensions that can be unleashed in oilpatch communities when concerned citizens address industry practices, although it is important to stress that industrial sabotage is not a typical form of rural resistance in Alberta. Nonetheless, the extreme actions undertaken by the RCMP, which will be explained in detail below, and the provincial government which devoted millions of dollars to establish an anti-ecoterrorism task force indicate the lengths to which the authorities will go in Alberta to prevent resistance against the oil and gas industry.

The Ludwig and Boonstra families had arrived in the Peace Country in 1985 with the hopes of fulfilling Ludwig's dream of establishing a self-sufficient Christian lifestyle in relative isolation from the rest of the world. In the early days Ludwig was neither overly concerned with the environmental impact of the oil and gas industry nor enthusiastic about environmentalists due in part to his

conservative (social and religious) beliefs. At the time there was also only one oil well near the Trickle-Creek farm and one gas plant eight kilometres away. During the 1980s, however, geologists found significant gas reserves underneath the South Peace Country. By the early 1990s, the energy industry in the province had also recognized the potential profits that could be derived from large-scale development of natural gas reserves. Rapid expansion of the gas industry in the Hythe area led to the proliferation of wells from twelve hundred in 1990 to twenty four hundred in 1997. This is similar to the pace and pattern of development that occurred in Turner Valley from the 1920s to the 1940s in Pincher Creek in the 1960s and 1970s, and numerous other communities sitting atop the western sedimentary basin. Oil and gas expansion in the South Peace region inevitably began to surround the Trickle-Creek farm as the number of wells in close proximity to it increased from one to twelve (Nikiforuk 1999, p.55; Vitello 1999, p.1).

The South Peace Country is a region of marginal agriculture carved out of the forests in the northwestern portion of the province and adversely influenced by a cycle of flooding and droughts. Consequently, many residents in the area benefited to an extent from the compensation and rent they received from the oil and gas companies that conducted surveying activity or erected facilities on their land. Moreover, the employment opportunities offered by the rapidly expanding energy industry were generally welcomed in such an economically vulnerable region. The Ludwigs, however, had settled in the area in order to escape what they considered to be the spiritually poisoning and corrupting influences of an

increasingly secular, commercialized world. So in 1990 when Calgary's Ranchmen's Resources Ltd. applied to drill a sour gas well just beyond the Trickle-Creek farm fence, it was seen as an unwanted outside intrusion.

Ludwig took his concerns about Ranchmen's proposal to the ERCB (which became the EUB in 1994). He argued at the ERCB hearing that sour gas facilities in close proximity to the farm were not compatible with a "God-fearing lifestyle" (Nikiforuk 1999, p.55). The Board did not deem this argument to be a compelling enough reason to interfere with further development of the sour gas industry, which accounts for over 30% of the gas extracted in Alberta, and was in the process of becoming what is now over a \$4 billion business in the province. It is also significant to consider that once the Ranchmen's well was in operation it was worth \$4 million to the company, and the provincial government derived over \$750,000 in royalty revenue from it. After his failed hearing, Ludwig decided not to deal with the company's landmen (see Glossary for "landman") when they came out to the farm to discuss future development plans. However, he continued to request public hearings with the ERCB (Nikiforuk 1999, p.55).

In 1991 the Ranchmen's well leaked sour gas into the atmosphere, but the company did not notify the residents of Trickle-Creek about the incident. Ludwig claims that later the same spring a significant number of his sheep had spontaneous abortions. In 1993 Ludwig initiated another public hearing with the ERCB regarding emissions from the Ranchmen's well. At this hearing, the lawyer representing Ranchmen's was able to argue that Ludwig had not attempted to resolve his concerns directly with the company because of his refusal to speak

with its landman. The Board ultimately ruled that the well did not pose a significant impact and thus it was not shut down. A short time after the hearing another much larger discharge occurred and this initiated the first of three forced evacuations of the Trickle-Creek farm. This incident provoked an evening of coughing and vomiting for the members of Trickle-Creek who spent the night in a motel room in Hythe. The ERCB ordered Ranchmen's to shut the well down at once. At a public hearing held shortly after the discharge, the Board criticized Ranchmen's, but nonetheless it gave approval for the reopening of the well (Nikiforuk 1999, p.55).

Ludwig decided to follow a new course of action when he offered to sell his farm to Ranchmen's. It is not uncommon for companies to either offer compensation or purchase land from landowners that have raised grievances against their practices. Yet, Ranchmen's was not interested in Ludwig's offer. This encouraged the Ludwigs to begin keeping a daily journal of incidents related to the surrounding gas facilities, a practice commonly undertaken by rural residents living near oil and gas activity. The family also sent hundreds of letters to the EUB, oil and gas companies, and a number of government departments. These efforts were largely of no avail as development of energy industry facilities continued in the area along with discharges and flaring emissions. In 1996, two women from the Trickle-Creek commune experienced miscarriages, and Ludwig argued that each one of these could be linked to emissions of hydrogen sulphide. As a result he sent a letter to the EUB claiming that murder had been committed at Trickle-Creek and that the family's patience had been exhausted.

One of Ludwig's responses to the increasingly desperate situation was to travel around the province acquiring information from other rural residents who had experienced environmental and health impacts from industry activities. He visited with dozens of farm families throughout Alberta and discovered that many of them had experienced what they believed to be personal health effects related to flaring and other industry practices. These people confided that their livestock had also suffered inordinately high rates of spontaneous abortions and respiratory problems. Most of these rural residents expressed frustration with the EUB, which in each case predictably concluded that their health symptoms and those of their livestock could not be conclusively linked to industry activities such as the flaring of hydrogen sulphide (Nikiforuk 1999, p.56). Ludwig went on a number of these information gathering tours and met with numerous environmentalists and rural activists in the province in his quest to resolve his concerns regarding impacts of energy industry operations.

MonkeyWrenching

In the winter of 1996, oil and gas company employees and the RCMP noticed a pattern of vandalism of oil and gas facilities in the South Peace country. Initially the "monkeywrenching"¹⁰ included placing obstructions on roads used by

¹⁰ The term Monkeywrenching was popularized by Edward Abby in his 1975 novel *the Monkey Wrench Gang*, which depicts the exploits of a group of ecological activists who utilize tactics such as tree spiking or vandalism of vehicles used by industries responsible for environmental destruction. Dave Foreman, the founder of the environmental organization Earth First, advocated the use of monkeywrenching along with acts of civil disobedience in his efforts to steer his group away from anthropocentric concerns such as health hazards and air and water pollution. He argued that mainstream environmental groups were preoccupied with the latter, and that his group should concentrate on the protection of nature. In 1987 Foreman co-edited along with Bill Haywood a manual of monkeywrenching tactics of direct action entitled *Ecodefense: A Field*

energy industry vehicles and puncturing their tires. The incidents later escalated to include the bombing of well sites and a pipeline. In 1997-98, four well sites were bombed in the Hythe area. Bullets were also fired through the windows of the AEC office at its gas plant in Hythe. The AEC superintendent for the area, whose office was the target of the sniper attack, received an anonymous letter afterward that stated "You asshole. Next time it will be right through your head" (Nikiforuk 1999, p.57).

AEC, which is one of the largest gas companies in Alberta and operates most of the wells in close proximity to Tickle-Creek, experienced a significant amount of damage against its facilities. In 1996 Ludwig entered an AEC well site and told the employee stationed there that the well and the employee's residence could potentially be targets of terrorism. Ludwig and AEC president Gwyn Morgan met in Edmonton in early 1998 to discuss their concerns. Shortly afterwards, AEC, which had already incurred over a million dollars in damaged equipment and security expenses, hired an ombudsman to deal with farmers and installed more advanced pollution control equipment at its Hythe gas plant. After this the vandalism against AEC facilities subsided for a while.

The peace in north-west Alberta was disrupted after the Union Pacific Gas Company went ahead with its plan to conduct a well test flare which included a period of gas venting at an exploratory well close to Trickle-Creek. Ludwig had contacted the company to ask them not to go ahead with this procedure since two women on the farm were in the early stages of pregnancy. Not long after the

Guide to Monkeywrenching (Foreman 1987). A copy of this book was confiscated by the RCMP during a raid at the Trickle-Creek farm in 1998 (Levine 1998).

well-site was cemented in and six months later in March 1998, a bullet hit Union Pacific's regional gas plant. That summer Ludwig began negotiating with AEC for a buyout of his property. The family was arranging to leave Trickle-Creek by October, but in late July, in the final stages of negotiations, AEC attached previously unmentioned stipulations to the agreement. The changes in the contract would have prevented the Ludwig family from entering within an eight-hundred kilometre radius of Grand Prairie, and Ludwig would have been barred from speaking about any environmental problems observed at Trickle-Creek. It is not unusual for oil companies to attach "muzzlement" clauses to out of court settlements (Staples, July 23, 2000 Pp. E8). Nonetheless, Ludwig responded to these stipulations by informing AEC's environmental consultant Paul Belanger that "we are going to stay and deal with the industry" (Nikiforuk 1999, p.58). Within days, two bombs targeting AEC wells went off.

In January 1999, a bail hearing was held for Ludwig and Boonstra on charges of conspiring and counseling a third party to undertake property damage and counseling to possess explosives utilized against industry facilities between September 1 and November 30, 1998. At the bail hearing it was revealed that only one explosion occurred during that period and it was at an AEC well located about 30 km from Trickle-Creek. It was further disclosed that the RCMP blew up the well in co-operation with the AEC. The RCMP explained that they undertook the action in order to provide one of their informants, Robert Wraight, a neighbour of Ludwig's, with assistance in gaining information by allowing him to

take credit for the bombing. This it was hoped would help him gain the trust of Ludwig and Boonstra (Mah Jan 29, 1999; Farrell Feb 2, 1999).

In late October 1998, the provincial government announced its approval of a three year, three million dollar budget to fight ecoterrorism. Shortly after the staged bombing on October 14th, the AEC and RCMP worked together to bring John Thompson, a terrorism expert from Toronto's Mackenzie Institute, to the Hythe-Beaverlodge area in order to conduct talks with residents about the growing ecoterrorism phenomenon. Some allege that such meetings increased anxiety among area residents; at the bail hearing Ludwig's lawyer Richard Secord argued that the meetings were used as a tactic to "whip up a frenzy" in the region (Mah Jan 29, 1999; Farrell Feb 2, 1999). Ludwig also argued that shortly after the talks by Thompson he received a number of death threats. It is also significant to note in this context that in 1999 private investigators were hired to interview members of the congregation that Ludwig formerly led in Goderich, Ontario. When asked by reporters why they were undertaking the interviews about Ludwig, the investigators responded by stating in order to "dig up dirt on him" (Nikiforuk 1999, p.58). The investigators did not reveal who hired them. Nonetheless, extensive information about Ludwig's past life began appearing in the media in 1999. The *Edmonton Journal* published a two part special report in January 2000 on Ludwig entitled "Of Faith and Fury," which focused almost exclusively on the personal lives of Ludwig and the members of Trickle-Creek, with an emphasis on church and community controversies the Ludwigs' had been engaged in. It also included extensive coverage of Ludwig's character foibles and

past mistakes in his personal life. Such stories certainly contributed to a widely circulating perception that the Ludwigs were confrontational people prone to trouble-making, and that Ludwig himself was fanatical and indeed an unsavoury character. To this date, as far as I am aware, there has not been comparable scrutiny of the personal life of an oil or gas company executive, EUB employee, or government representative that could shape the public's perception of such an individual in a similar fashion.

Vandalism and the Fracturing of Community

The industrial sabotage in the South Peace Country may have contributed to a strong sense of fear among numerous area residents. Certainly the town hall meetings orchestrated by the AEC about the threat of eco-terrorism, and the provincial government's open campaign against the phenomenon, seem to have been designed to increase the sense of anxiety and tension among and between area residents. Of course, a notable campaign of sabotage against oil and gas facilities is a legitimate and real cause for concern to people who could potentially be exposed to uncontrolled emissions of hydrogen sulphide and other hydro-carbon compounds which could be released from targeted wells, pipelines or other industry structures. Many area residents are also employed in the region's oilpatch or have family members who work in the petroleum sector; these individuals would presumably be among those most vulnerable to risks associated with damages caused to oil and gas facilities. Moreover, those with relatively well-paid, petroleum sector jobs in the region would quite

understandably feel a strong sense of frustration, and in many cases anger, toward those conducting a concerted struggle— and is receiving considerable media exposure—against an industry which is providing them with a livelihood. The tactics thus used by Ludwig and Boonstra, and perhaps others that stirred up tension in the south peace country during the late 1990s strained community relations profoundly and ultimately polarized residents into seemingly opposing groups.

Ludwig is undeniably a controversial figure as manifested by his openly autocratic personality and his eventual decision to use industrial sabotage rather than relying strictly on negotiation to settle disputes. He has also received much critical assessment due to the social tension within and polarization of communities in the South Peace Country that his actions and rhetoric have contributed to (Nikiforuk 1999, p.53). Nonetheless, some people in rural communities who have been through similar experiences with oil and gas companies as Ludwig and certain members of the environmental movement and media are sympathetic to him due to the exposure he has given to the issue of sour gas flaring and emissions. Henry Pirker, a beekeeper, environmentalist and farmer in the Peace Country who has published scientific papers on pollution, observed the following about Ludwig's actions and impact in 1999 during the peak of the tension in the area:

It might have been better for him had he backpedaled some. But I still think he's done a great historical service to Albertans. I believe that. And I'll tell you this he's got allies. Lots of them. Just nobody wants to say anything now, because of the mess going on over here. It's no secret to anyone living here that there's a real

environmental crisis happening. Wiebo has gotten somewhere. I stuck to the science and I got nowhere (Gillespie 1999).

Commenting on the extent of animosity felt in the Peace region, Grand Prairie environmentalist Jim Nelson observes:

There has been one hundred and sixty acts of eco-terrorism in this basin in the last three years. Yeah, Wiebo and his boys have been busy, but they sure haven't been up to all that on their own (Gillespie 1999).

Many rural residents understand the frustration felt by Ludwig and can relate to the experiences he has been through with oil and gas companies and the struggles he has had in trying to resolve his problems through conventional channels such as the EUB. The similarity of the Ludwigs' experiences with those of other residents of oilpatch communities is described by journalist Andrew Nikiforuk who believes that "anyone who has dealt with the oil and gas industry can understand Wiebo Ludwig and why he lost it" (Gleason May 2, 2000). Jim Nelson similarly elaborates on his thoughts about the impact of Ludwig's actions on the social environment in the South Peace region:

What's so confusing and troubling about this whole thing is that people now have a real hate-on for Wiebo, but they have a hate-on for the oil companies too, even though so many people rely on them for work. Wiebo's thing has always been fugitive emissions. You know, glaring mistakes in the extraction and flaring process. But that's just one out of hundreds of problems. Beaverlodge is a crippled community, and even if Wiebo went away tomorrow, the problems would still be there (Gillespie 1999).

Sour gas has been a contentious and intensely disputed topic in rural regions for decades, but Ludwig caused the health and environmental issues related to gas flaring and other emissions to receive substantial coverage in the local, provincial, national and even international media. Such widespread and

regular coverage of sour gas issues has invariably shaped disputes surrounding them. Although sour gas has received the most media attention environmental and health concerns in general are coming under greater scrutiny in the province. Rural Albertans are now both more aware of the extent of the problems related to oil and gas operations and the strength of the frustration felt by those affected by them. They are also cognizant of the fact that sour gas is now an issue that people, rural and urban, are paying close attention to. Moreover, industry, the EUB, and the provincial government are aware that it is imperative for them to convince the public that they are making serious efforts to deal with perceived negative impacts of oil and gas production. In this vein, Andrew Nikiforuk was informed by an energy industry landman that the work he does has changed since the Ludwig affair began receiving press coverage. As he explained it "petrochemical work is no longer being approved over a farmer's coffee table in 15 minutes" (Gleason May 2, 2000). This new situation has forced industry and the EUB to take steps such as publicly announcing their efforts to reduce emissions and to conduct more regular public and stakeholder meetings regarding proposed developments etc.

Conclusion

The campaign of industrial sabotage undertaken in northwestern Alberta during the latter half of the 1990s is certainly an anomaly in the pattern of relations between rural residents and the oil and gas industry. Thus when Ludwig began openly criticizing the impacts stemming from the practices of oil and gas

companies and stating his sympathy for acts of industrial vandalism, he arguably fostered an atmosphere of anxiety and social polarization in the Peace Country. However, he also called widespread attention to the health and economic hazards associated with oil and gas developments, specifically expansion of sour gas extraction, for residents living in close proximity to energy industry facilities. It is certainly not unusual for oil-patch communities to witness anger and frustration with the environmental, health, and economic impacts of industry activity. Nor is it uncommon for rural residents to become disenchanted by the inability of the regulatory apparatus to minimize such effects. Ludwig discovered on his information gathering tours around the province in the late 1990s that there was an informed population in rural Alberta that was closely assessing the contributions of the oil and gas industry to the public interest. Many of these people, like Ludwig, had decided that the way disputes between oil and gas companies and concerned residents are handled by the provincial regulatory authorities must change. Such residents are determined to play an essential role in shaping that process of change whether or not industry and government welcomes their actions. Even though most of those rural residents do not wish to emulate Ludwig's tactics, nor do they endorse them, their efforts to address issues with oil and gas companies will, in the wake of Ludwig's actions, take place in an environment of increased awareness and growing public exposure and scrutiny.

7. Rural Resource-Dependency and Environmental Controversies

The real source of modern technological risk is the relationship between technology and modes of economic production designed to produce things faster and cheaper by allocating the hazardous byproducts of production to those most defenseless against them.

— Stephen Couch and Stephen Kroll-Smith *The Real Disaster is Above Ground: A Mine Fire and Social Conflict*

The social, political and economic environment in rural Alberta along with the specific effects that chronic exposure to harmful emissions have on community relations profoundly shape the ways in which attempts at resolving environmental disputes in rural parts of the province are undertaken. Resource dependency in oilpatch communities combined with a strong political conservatism act as constraining factors affecting concerned residents' willingness to speak out or take action against oil and gas companies. These social conditions also limit the level of community support that residents will receive if they do attempt to address the impacts of oil and gas activity. Moreover, chronic exposure to hydro-carbon contaminants introduced into the environment from oil and gas extraction and processing is not experienced uniformly throughout oil-patch communities. This can lead to social fragmentation when concerned residents within the community raise the impacts of industry practices because not everyone will perceive that there are environmental problems. Consequently chronic exposure issues can contribute to a profound sense of alienation for those who decide to address them.

Political Conservatism, Agricultural Change, and Inequality in Rural Alberta

Rural Alberta is the heartland of the province, both as a source of mineral and agricultural resources, and as a hotbed of political conservatism. These factors have placed the provincial Conservative Party in a precarious position, since the party presumably does not want to appear to be insensitive to the concerns of residents who are negatively impacted by resource development in the geographical region of its greatest support. This problem is further compounded by the fact that provincial Conservative governments have made a habit of conceptualizing and defining the public interest in terms of economic growth that is fueled by the development of petroleum resources. Moreover, rapid expansion and deregulation of the oil and gas industry combined with growing societal awareness of related ecological problems have fueled tensions. Similarly, the reality that Alberta's urban centres have benefited economically to a considerably greater degree than rural regions is an additional factor shaping the social, political and economic environment in rural Alberta. These conditions have consequently encouraged increasing numbers of rural residents to reject the idea that their disproportionate exposure to various toxins produced by oil and gas companies is acceptable to any meaningful definition of the public interest.

In the past few decades the growing economic importance of the petroleum industry in Alberta has occurred at a time of relative decline in the contribution of the agricultural sector to the economic output of the province. Moreover, feedlot production, which now accounts for the vast majority of beef

raised in the province, has resulted in further marginalization of smaller scale farmers and ranchers. Agri-business cattle production in Alberta is centred in south-central Alberta in a corridor between Brooks and Lethbridge; it is referred to as "feed-lot alley." Eighty to ninety percent of feedlot production occurs in south-central Alberta, with seventy-five percent of finished beef cattle in the province produced on one hundred feed lots in "feed-lot alley" (Alberta Cattle Commission 2001, p.1). Interestingly, the region between Brooks and Lethbridge is an area in which the gas that is extracted has a low hydrogen sulphide content (PCF Sour Gas 2001, p.6) (see map in Fig. 1). By contrast, much of the small-scale ranching in the province is located in an area characterized by marginal crop land in the eastern-slopes region where the sour gas industry is centred. Many disputes related to sour gas flaring, presently the key environmental and health concern related to oil and gas production in Alberta, are thus occurring in a region where agricultural producers are not economically powerful. Therefore the provincial government may feel more compelled to neglect the interests and concerns of the economically marginal members of communities than to risk pressuring powerful oil and gas companies into devoting additional resources to operating in a more environmentally sensitive fashion, adequately compensating rural residents they have negatively impacted, or curtailing industry expansion due to the resistance of some residents. Such inclinations are undoubtedly accentuated by the fact that the majority of rural Albertans are unwilling to support political parties that are not politically conservative. Thus, in the absence of a right-wing alternative party, Progressive Conservative politicians can count

on the fact that regardless of how disenchanted some rural residents become with their policies, the party will still achieve success in rural ridings.

Resources and the Cycle of Dependency: A Theoretical Perspective

One of the key factors that has shaped the nature and extent of environmental disputes in rural Alberta is resource dependency. Decline in regional agricultural economies has increased the tendency for communities to become dependent on oil and gas production. The oil patch provides some residents with the opportunity to secure well-paid employment, thus reducing the likelihood that they or their family members will openly criticize or challenge the practices of oil and gas companies. Moreover, municipal politicians, small business owners and local chambers of commerce all tend to be supportive of resource extraction developments in rural communities. This stems from their desire to find ways to diversify and expand the regional economic base.

Development of regional economies through resource extraction industries holds a whole host of problems that are not readily visible to municipal politicians and local business leaders eager to attract taxation revenues and economic diversification, or to residents who often welcome the high-paying jobs that such activities are perceived to generate. In order to illuminate the pitfalls of resource development at the regional level, it is helpful to look at William Freudenberg's (1992) exploration of the effects of resource development in rural communities in the United States. In his study "Addictive Economies: Extractive Industries and Vulnerable Localities in a Changing World Economy," Freudenberg equates the

possible effects of a variety of different forms of resource extraction — including mining, forestry, and energy — with drug addiction. Freudenberg poses the following question which could help guide debate in communities contemplating the economic benefits or pitfalls of resource development:

At the regional or community level, the issue is not one of whether residents initially seek to attract extractive activities, whether experts warn against the potential danger of becoming too heavily dependent on those activities, nor even whether, having once moved in the direction of an extractive employment base, affected communities and regions will tend to show a desire for more of the same. The question, instead, is whether the consequences will have more in common with development or debilitation and, if the latter, whether a community that wishes to move away from such an economic dependence will be able to do so—or alternatively, whether “resource-dependent” communities will show more than just a linguistic resemblance to an individual’s “dependence” on drugs (Freudenberg 1992, p.307).

In Freudenberg’s view extractive economies will most likely experience economic difficulties in the early twenty-first century for a number of reasons. The first is that, given the trends of the latter half of the twentieth century, the costs of resource extraction will continue to increase over time, while global commodity prices will likely stagnate or even decline. These conditions create what Freudenberg terms a “cost-price squeeze” in resource industries, where the cost of production leads to the abandonment of extraction activity well before local resources are depleted. This situation is aggravated by a tendency for the least costly resources to be extracted in the early stages of production (Freudenberg 1992, pp.309-310). This is certainly the case in Alberta, where conventional resources are dwindling and industry is increasingly focusing on costly oil sands production. Similarly, natural gas production is increasingly relying on the

removal of sour gas, with its greater processing, environmental and social costs (witness the movement of the sour gas industry into more heavily populated regions including suburban communities).

Freudenberg cites a number of reasons for how such a counter-intuitive process as a downward price trend could take place through the extraction of finite resources. Particularly important are the technological advancements that have allowed for the discovery and removal of formerly inaccessible sources of resources — for example, developments in bitumen extraction during the last thirty years have brought into recognition the existence of oil reserves in Alberta larger than those currently known to exist in Saudi Arabia (Economic Development Edmonton, p.4). The rapid growth in economic importance of sectors that are not heavily dependent on raw materials (such as information technology), in conjunction with more efficient use of resources by industries and households, has also led to a dramatic drop in prices of primary commodities in recent decades. The masking of the downward price trend in resource commodities is accentuated in the case of energy industries because of the remarkable boom-bust cycle that accompanies oil and gas commodity prices. This economic cycle makes the invariable downward commodity price trend almost invisible. For instance the period of 1973-1982 (the boom years in Alberta) in the energy sector served to mask a long run reduction in the price of oil. This boom was also a market anomaly since it resulted from the political manipulation of markets by member states of the Organization of Petroleum Exporting Countries (OPEC) (Freudenberg 1992, p.309-312). The rapid increase

in the price of oil in the latter 1990s and early twenty-first century was also orchestrated by the efforts of OPEC to control the supply of oil on world markets. The tremendous economic growth that such price manipulations create in petroleum producing regions — particularly jurisdictions such as Alberta that have a more costly non-conventional emphasis — shields the overall cost-price squeeze that is observable from the longer run historical perspective.

Freudenberg identifies a number of reasons why resource dependent regions find it difficult to heed advice regarding the risks of extractive economic development. These include the fact that economically viable sources of resource extraction are increasingly located in isolated or remote regions due to the exhaustion of resources in close proximity to population centres. Geographical isolation offers such localities little flexibility in negotiations with larger centres where processing and marketing of resources occur. Similarly, a trend toward capital and technological intensity in resource extraction industries means that there is a growing discrepancy in power between extraction firms and local communities. Thus, for these reasons, the ability of resource regions to diversify economically is decreasing (Freudenberg 1992, pp.317-318). In Alberta, this seems to have occurred not only at the local level, as has happened in the eastern slopes region and many other parts of rural Alberta, but also at the provincial level, as the downward trend in economic diversification has made the province's economy less diverse than it was in 1971¹ (Anielski 2000, p.9).

¹ Despite the recent growth of dot.com firms in Calgary the high-tech sector has not become a substantial growth engine. Interestingly statistical data compiled in the Pembina Institute's *Alberta Sustainability Trends 2000: The Genuine Progress Indicators Report 1961 to 1999* indicates that the provincial economy is currently less diverse than in 1971. This suggests that despite the

Freudenberg points out that government effort to create favourable business climates in resource regions often do not have a positive effect on economic performance in the long run. This is because tax incentives and deregulation of environmental and labour standards are measures that have been taken by governments almost everywhere in recent decades.

Consequently, programs such as the "Alberta Advantage" generally create conditions where "the net result has more in common with a widespread subsidy to business than with actions that will exert a significant effect on business location decisions" (Freudenberg 1992, p.319). It is also undeniable that the primary reason for a resource firm to locate in a given region has more to do with the presence of resources in quantities that are potentially marketable than with tax incentives. This reality certainly accentuates the tax give-away effect of policies such as the "Alberta Advantage." The previous example of Alaska and Norway maintaining equally viable petroleum sectors as Alberta, while charging considerably higher royalty rates, seems to support this assertion (Macnab et al 1999, p3-4). This point is supported all the more by the fact that Alaska is located at an even greater competitive disadvantage than Alberta from markets (Macnab et al., 1999).

tremendous wealth that has been produced in the half century since Leduc #1 Alberta is now firmly locked in a cycle of economic dependence on petroleum (Anielski et al. April 2001, p.9.). Such a statistical reality is also quite compelling in light of quite incessant media coverage extolling the virtues of Alberta's economic expansion which is often presented as being accompanied by a diversification of the provincial economy beyond oil and gas production (Bergman, Brian February 12, 2001 *Maclean's*, pp.1,14-22).

Further barriers to economic diversification stem from the fact that communities tend to specialize around the servicing of resource industries. Freudenberg explains the possible effects of over-specialization in remote resource communities:

In some cases, in fact, growth in extractive employment may create not so much an increase in the ability to adapt to changing circumstances as a decrease—not so much an increased flexibility and adaptive capacity as an increased specialization in and commitment to the extractive industry in question (Freudenberg 1992, p.321).

This risk is particularly evident in the realm of labour, where relatively high-paying resource sector jobs encourage local residents to avoid pursuing advanced education or developing entrepreneurial skills. This is not to say that such residents do not develop specialized skills. Resource workers generally do specialize, but they actually over-specialize, thus diminishing their ability to adapt to changing economic conditions such as shrinking markets caused by declining commodity prices etc (Freudenberg 1992, pp.322-323). There thus appears to be a disincentive in resource communities for people to acquire the educational skills and social and economic knowledge that is necessary to facilitate economic adaptation and consequential diversification.

The benefits of petroleum production in Alberta have been distributed primarily to the larger urban centres because of a number of aspects of oil and gas extraction and processing. Oilpatch activity generally requires a transient work-force, due to the fact that much of the employment it generates stems from exploration, initial construction of facilities and drilling. Since the workforce for such activity is not stationary, the high wage employment it generates does not

necessarily jumpstart stable economic development within communities.

Moreover, the processing that occurs in rural regions is conducted in order to allow the resources to be effectively transported to refineries and/or distant markets. For the most part, processing facilities in rural areas consist of gas flares at batteries where unwanted hydro-carbons are flared and/or vented into the atmosphere, benzene dehydrators where water is removed from the gas so it can be transported to market, and gas plants where unwanted hydro-carbons are removed and flared, vented or processed into marketable commodities, such as sulphur in the case of hydrogen sulphide. These facilities do not require a large permanent workforce.

Most economic diversification fostered by energy extraction such as large scale refining facilities that create significant levels of employment, is mainly located in urban centres (specifically on refinery row in Edmonton's east-end). The petrochemical industry is located primarily in Edmonton, as are many of the oil field servicing companies, although a number of smaller cities such as Fort McMurray, Grand Prairie, Red Deer and Medicine Hat act as service centres for regional oil and gas economies. The bulk of engineering employment is centred in Edmonton because of its status as the premier service centre and the presence of the University of Alberta, with its emphasis on engineering (its chemical and mechanical engineering departments are among the largest in the country) (EDE pp.1-6). Calgary has the lion's share of corporate business development, with the second largest number of corporate headquarters in the

country, after Toronto. It has thus secured much of the province's white collar employment and corporate tax revenue.

Environmental Contamination: A Source of Social Division

Social and political conservatism and resource dependency are not the only factors shaping environmental controversies surrounding the oil and gas industry in rural Alberta. The characteristics of environmental incidents themselves can determine how a community will react to the real or perceived implications of events. In "Contamination, Corrosion and the Social Order" Freudenberg observes some of the differences between the ways that communities deal with and are impacted by natural catastrophes versus technological disasters. Freudenberg explains that generally "if the aftermath of a natural disaster is typified by volunteers who come in to offer a hand, the aftermath of a technological disaster is perhaps best typified by lawyers who offer instead the back of a hand" (Freudenberg 1997, p.30). Environmental controversies stemming from industrial activity tend to introduce blame; a force of potential division and social disruption in communities that is largely absent from natural disasters. Freudenberg elaborates on the possible effects of this:

After a technological disaster, as a result, rather than working cooperatively to deal with problems that were 'nobody's fault' and that resulted from natural processes, the victims can experience a second victimization, becoming participants in a socially corrosive struggle over affixing blame, and frequently finding that they become the victims of blame themselves—a phenomenon that adds insult to the injury they suffered from the initial disaster. Rather than seeing the authorities act in a way that is generally helpful and appropriate, the victims often report that they find authorities to be evasive and nonresponsive, often more concerned

with providing
 genuine.
 The efforts at
 resolving environmental chronic
 problems by residents
 as possible, lodgepole,
 and the pipeline Eastern
 British Columbia source of
 drinking water practices
 more, planning and storage etc.,
 are historic problems. For
 instance, in one or more, even
 when health problems by residents, it
 can be difficult problem
 because it has people can
 remember in the Fraser Valley
 Alberta where calls
 discussions since there is nothing
 wrong with their fields as
 fertilizer, which there ever
 was the problem. In regions
 where residents industry,
 criticisms of the business the
 contamination

with protecting bureaucratic prerogatives than with providing genuine assistance to victims (Freudenberg 1997, p.31).

The problem of social division, which can profoundly shape efforts at resolving environmental issues, is further accentuated in the case of chronic problems, due in part to the fact that they are not readily perceived by residents as possible community disasters. Sour gas well blowouts such as Lodgepole, and the pipeline rupture that dumped oil into the Pine River in North Eastern British Columbia in July 2000, contaminating the town of Chetwynd's source of drinking water, are easily identified as disasters. However, industry practices more typical in oilpatch communities such as flaring and drilling mud storage etc., are chronic problems that are not easily conceptualized as disasters. For instance, in communities where flaring has occurred for forty years or more, even when health effects such as respiratory problems are experienced by residents, it can be difficult to perceive flaring as a disaster or even a substantial problem because it has been present in the community for as long as most people can remember. In this vein, Terri Reuser, a public health nurse in Turner Valley Alberta where oil and gas activity has occurred for eighty years, recalls discussions she has had with "old-timers" who have argued that there is nothing wrong with drilling mud since in the "old days" they spread it on their fields as fertilizer, which apparently worked quite well. "Best damn fertilizer there ever was," one oldtimer informed her (interview, telephone, July 6, 2001). In regions where residents have become so habituated to the presence of industry, criticisms of its practices and/or attempts by area residents to address the contaminating effects of industry can arouse suspicion.

The tensions that emerge from attempts to address issues arising from the activities of polluting industries are often amplified by the perception that such efforts may threaten economic activity in the area. Most typically, industry and oil and gas workers perceive a threat to their economic situation. However, municipal politicians and members of chambers of commerce also commonly view such efforts as threats to the image of their community. For many politicians, denial of environmental problems is preferable to accepting that their communities may be toxic. This concern is further amplified in communities that have an opportunity to attract forms of economic activity other than resource-extraction. The neighbouring communities Turner Valley and Black Diamond in the eastern slopes south of Calgary provide good examples of this predicament, since they are both located in the foothills with lakes and forests nearby, and the Rocky Mountains looming in the distance. They thus possess natural amenities that can facilitate tourist development. Similarly, these areas are in the process of becoming "scenic" bedroom communities of Calgary (which represents the possibility of breaking out of resource dependency). Yet the long history of oil and gas activity in the area — much of it conducted in an era of little or no environmental regulations — coupled with current flaring and venting from gas wells, has created conditions of striking contrast to the perception of the community as a place of natural beauty (which is after all the primary attraction for Calgarians who are interested in purchasing property there). For instance, when a contractor was recently bulldozing land for a new subdivision an old abandoned pipeline that had contaminated the surrounding soil was uncovered

(interview, telephone, July 6, 2001)). Turner Valley and Black Diamond also have the highest prevalence of multiple sclerosis (MS) in Alberta — which incidentally has one of the highest rates of occurrence of this disease in the world (Okotoks Western Wheel, May 23, 2001). There has also been an abnormally high rate of brain tumours identified in the region (OWW May 23, 2001). A number of area residents have spoken out about the possible linkages between present and past oil and gas activity and the high rate of MS and other health problems. They have held town hall meetings to address these issues and petitioned the public health authorities to conduct further studies into the possible environmental sources of the inordinate occurrences of these conditions. Terri Reuser, who has been instrumental in these efforts, explains how local politicians have not been supportive of their attempts to deal with the health complications and environmental damage in the area. The mayor of Black Diamond actually wrote a letter to the editor in the local newspaper condemning the activist's efforts to raise awareness of local environmental problems. Reuser elucidates why their efforts to address these issues provoked such a response by stating that “they (local politicians) want development and so they want people to shut up” (interview, telephone, July 6, 2001). Reuser, who has recently been diagnosed with MS, has a very different perspective of the local environment than the official and popular conception of the region:

Turner Valley is really beautiful—hills, forests, streams. Yeah sure, tourists and others come here because it's so nice, but it is such a toxic place—industry has been here for so long, and they've done whatever they wanted (interview, telephone, July 6, 2001).

This interpretation of the regional environment is quite obviously one that municipal and provincial politicians concerned with luring recreational and residential development to the area are not eager to see accepted by significant numbers of people.

Chronic Exposure Disputes: A Recipe for Community Deterioration

Environmental controversies stemming from situations of chronic exposure differ not only from the social responses that natural disasters provoke, they also differ from other kinds of ecological disputes that arise from industrial activity. Stephen Couch and Steve Kroll-Smith identify the communally destructive capacity of chronic technological disasters in their study *the Real Disaster is Above Ground: A Mine Fire and Social Conflict*. In this work, they analyze the conditions which polarize communities pitting neighbour against neighbour during a protracted underground mine fire that has been burning since 1962 in Centralia, Pennsylvania, an anthracite mining region of northern Appalachia. The fire slowly traveled to homes and commercial and public facilities in the region, venting poisonous gases into basements and through floor boards, and ultimately destroying the social fabric of the community. The social effects of environmental controversies arising from situations of chronic exposure, in relation to other types of environmental disputes is further articulated by Couch and Kroll-Smith in their 1994 study "Environmental Controversies, Interactional Resources, and Rural Communities: Siting Versus Exposure Disputes." They define siting disputes as those associated with the

location of unwanted land uses, such as municipal landfills, hazardous waste incinerators and other waste storage facilities. Exposure disputes, on the other hand, stem from prolonged processes, such as in Centralia where contamination was not foreseen or immediately recognized, nor evenly distributed throughout a community. The authors make the following compelling observation about the social impacts of these types of disputes:

In contrast to the regeneration of local solidarity in siting disputes, the discovery of toxic substances already in a community is likely to generate intense hostility at the local level, creating sharp divisions among former allies and a climate of suspicion and doubt about the good intentions of local government and other traditional authorities (Couch and Kroll-Smith 1994, p.26).

An interesting aspect of siting versus exposure disputes is that in the latter, residents already have experience with the impacts of industry practices (albeit some have more than others), whereas in the former, residents generally do not have such first-hand experience. It is in siting cases that communities tend to unite together to resolve the controversy. Couch and Kroll-Smith provide some insight into this seemingly implausible pattern of events and outcomes.

Essentially, in siting disputes, such as proposals for toxic waste sites, residents conceptualize possible impacts from the introduction of a source of contaminants into the community. Such conceptualizing often leads to the perception that the community is at risk from the proposed development, which is typically viewed as an outside threat. Such risk interpretations in turn serve to unite members of the community against given proposals. Exposure disputes, on the other hand, are shaped by the fact that even though contamination is physically present in the community, it is not always visible to the senses (Couch and Kroll-Smith 1994,

p.34). This was the scenario that unfolded in the case of toxic fumes travelling through underground fissures and into people's homes in Centralia. Another prime example of this is the contamination of groundwater sources in Alberta from chemicals that have leached out of sumps whose existence residents may or may not have previously been aware of. Couch and Kroll-Smith speak of how the relative invisibility of contaminants results in an ambiguity surrounding the medical implications of chemical substances in chronic exposure cases. As they explain it, very understandable and straightforward concerns, in conjunction with varying levels of exposure throughout a community, complicate the debate around medical impacts:

Simple questions ["How much toxicity is present?" "Am I absorbing any of these toxins?" "Is the absorbed dose dangerous?" (Vyner 1988:13)] are likely to remain sufficiently ambiguous to beg several interpretations. The ambiguous nature of the physical evidence of contamination (its medical invisibility) and the probability that different parts of the community will be affected in various ways usually means that people in different parts of the community appraise the physical disruption differently. The multiple appraisals of danger in toxic exposure crises are likely to insure that neighbourhoods and groups in a town are experiencing divergent levels of stress and social disruption thus setting the stage for intramural conflict (Couch and Kroll-Smith 1994, p.34).

This is quite obviously similar to the situation in oilpatch communities, where those in close proximity (especially downwind) to a gas flare, gas plant, benzene dehydrator or other sources of environmental contamination have much greater cause for concern than those who live in a part of the same community where there is an absence or minimal presence of such facilities. In fact in July 1999 the Petroleum Communications Foundation released the results of a study it had commissioned into relations between rural communities and oil and gas

companies which found that four out of five Albertans living in petroleum producing regions had good to excellent relations with oil and gas companies (PCF July 29, 1999). In a media interview shortly after the release of the study's findings Phil Hanneman asked "which four Albertans? If you want to find angry, frustrated farmers look for them adjacent to gas plants" (Seskus July 30, 1999).

Further frustrating the possibility of achieving socially unifying methods of dispute resolution in exposure controversies is the absence of clear-cut options, such as the simple choice of allowing or not allowing a site. Couch and Kroll-Smith explain that the more complicated nature of exposure situations leads to numerous different interpretations of the situation; this in turn causes the formation of multiple choices for those attempting to resolve the dispute. This is even further complicated by the fact that there are usually better developed formal regulatory mechanisms or procedures for community residents to participate in the case of siting disputes. In typical exposure situations, members of communities often have few, if any, opportunities to legitimately exercise power over decision-making processes. This was the case, for instance, in the grandfathering of sixty one gas plants in the province in 1988. Unless a company applies to upgrade a plant's productive capacity residents living in close proximity to it simply have to accept its presence even though it is increasingly evident that these facilities emit considerably more hydro-carbon compounds and in higher concentrations than was believed at the time they were grandfathered (EUB January 2001). [The absence of legitimate means of participating in decisions surrounding sour gas developments was brought into focus by Wiebo Ludwig's

campaign of industrial sabotage which he conducted after numerous failed attempts at addressing industry practices through the EUB.]

Rimbey: A Community Struggling with Chronic Exposure

The sort of community divisiveness that emerges in exposure disputes was hinted at earlier in the case of Turner Valley, with local politicians behaving dismissively toward citizen activists and their efforts to raise awareness of the possible effects of local contaminants. To bring the issue into even sharper focus, I will assess the case of the Rimbey area in west-central Alberta, where a number of residents in a particular geographic section of the community have been struggling with industry over a variety of sources of contamination that have long been present in the local environment. The Rimbey area — which, incidentally, is also in the eastern slopes region — has had oil and gas development for approximately forty years, including the large scale Rimbey gas plant built in the early 1960s. There is intensive oil and gas activity throughout the region, with some parts of the area having more sources of emissions than others. Travelling west of the town of Rimbey, farming operations quickly become less productive as the western forest meets farmland. At the western fringe of agricultural productivity is the Wilson Creek area, where there exists a remarkable density of gas flares, benzene dehydrators and a grandfathered gas plant. In fact, when driving in the evening south of the Petro-Canada Wilson Creek gas plant, the proliferation of gas flares in the valley below makes it appear “like a lit up birthday cake,” as area resident John Chalak describes it

(interview, Rimbey, Aug 19, 2000). Numerous different companies, such as Talisman, are treating this valley like a resource fiefdom². The situation there has led Phil Hanneman who is active in the valley in support of residents attempting to address industry practices, to refer to the area as "Canada's Ogoni Land" (in reference to the region in Nigeria where Shell has established a reputation as a destroyer of the environment and society and where Ken Saro-Wiwa attempted to address the social and environmental implications of oil and gas activity, which eventually resulted in his execution) (interview, Rimbey, Aug 19, 2000).

Fred Whatmore, who lives approximately a kilometre from the Wilson Creek plant, has had a particularly difficult time addressing his concerns about past and present industrial practices in the area. The grandfathered gas plant is licensed to emit 7.61 tonnes of sulphur daily, although its average output is 3.5 tonnes. The new standards passed in 1988 only exempted plants from adhering to sulphur recovery standards if they emitted less than one tonne per day. The smell of sulphur is often heavy in the air around Whatmore's farm, sometimes creating a thick haze that can literally be tasted. Whatmore experiences frequent fatigue and headaches, and his daughters suffer from an inordinate amount of colds. The Whatmores' have had a disproportionate rate of health problems in their cattle, including numerous premature deaths, slow weight gain and runny eyes, and many calves are unable to stand up after birth, probably as a result of damage to their nervous systems. Calves born in this condition generally die

² Talisman has been criticized by human rights groups and even members of Congress in the United States for its presence in Sudan. It is believed that the royalties it pays to the Islamic fundamentalist government in Khartoum have allowed the government to wage a bloody war against rebels in the predominantly Christian south of the country.

shortly after birth (Staples July 23, 2000, p.E8). Part of their cattle's pasture land is situated directly across the road from the gas plant.

It appears as though the health problems suffered by the Whatmores and their livestock may be related to the gas plant, but efforts to pin-point a culprit are aggravated by the fact that there are other sources of pollution in the area. A couple of years ago, Whatmore looked into his well and noticed a purple sheen, similar to the type of colouration that car exhaust leaves in puddles. Water testing showed that toluene was present in the well. Toluene can lead to neurological and bone-marrow damage (Seskus June 13, 1999). Shortly after this contamination was discovered, a thirteen-year old buried sump was found on a neighbour's property approximately 200 metres from the Whatmores' home; a company that previously held a lease there had left it. This sump is directly uphill from the Whatmores' residence and the contaminated well. The purplish sheen is not only apparent in the well water, but is visible in various pools of water on the Whatmores' land, some less than fifty metres from their home. It would seem that the hydro-carbon contamination is seeping from the sump; however, the same purplish sheen is evident in a beaver pond less than a kilometre up the hill from the sump, and across the road from the gas plant on land leased by Petro-Canada. Interestingly, this beaver pond was dynamited and a backhoe attempted to erase traces of the purplish sheen after its presence was revealed in the media. Despite such efforts to destroy potentially damning evidence, most likely undertaken by an oil company operating in the area, Phil Hanneman and myself

were able to secure photos of the contamination in August, 2000 after the bulldozing occurred.

The case of contamination at the Whatmore's is very revealing of the complications that occur during attempts to resolve environmental problems in cases of chronic exposure. Like the situation in Centralia, where the contamination was not immediately evident and reached residents through numerous routes, there are a variety of sources of contamination impacting the environment of the Whatmores' land. The situation is even more complicated in the Whatmores' case, however, since there are a number of different polluting practices involved, and more than one company responsible for such practices. The sump, for instance, was left by a company that no longer has a lease on the land and is now not legally responsible for the pollution left there. The regulator (EUB) is entirely incapable of assisting Whatmore in his efforts to clean up and seek compensation for the pollution emanating from the sump. This is characteristic of Couch and Kroll-Smith's identification of a lack of mechanisms allowing for citizen involvement in exposure disputes. It may be recalled that Freudenberg also mentioned bureaucratic unresponsiveness by regulators as a means of adding insult to injury for those dealing with the negative repercussions of contamination. Moreover, the considerable amount of contaminating emissions being released from the Petro-Canada plant are very difficult to address through the EUB, since it is a grandfathered plant and is operating according to the regulations. Whatmore and a group of area residents have been attempting to

address the issue of emissions from the plant, and this matter will be discussed in the next chapter.

The situation of the Whatmores is exemplary of exposure disputes also because of the community animosity that ensued in the wake of their attempts, along with those of some of their neighbours, to deal with the environmental issues related to oil and gas activity in the area. Rob Gilgan, editor of the *Rimbey Review*, has been covering oil and gas disputes in the area, and he believes that the efforts of Whatmore and his neighbours to limit emissions at the Wilson Creek plant is a divisive issue in the tight-knit community, one which causes tension between themselves and local friends of industry (Seskus June 13, 1999). Many area residents have found employment in the oil and gas sector, and some of them have even prospered from such development. The Mayor of Rimbey provided a standard politician's refrain about criticisms made against industry:

They live here (industry officials). Why would you want to destroy your own backyard? People are always talking about the environment. Some are more vocal than others and that is something that has to be taken into account. Overall, I think people are generally pleased with the availability of hearings and open houses over issues of the environment (Seskus June 13, 1999).

Certainly unequal exposure to oilfield waste and flaring emissions provides the primary motivation for some people to vocalize their concerns about industry while others remain silent. It is interesting that those in positions of authority in rural resource communities often construe the act of confronting industry as evidence of an inordinate and seemingly innate desire to criticize. The residents in the Wilson Creek area are using legitimate avenues in their

struggles with industry. These include attending public hearings set up by the EUB, and speaking to the media. Quite the opposite of pursuing some innate desire to be vocal Fred Whatmore, for example, would like nothing more than to sell his farm and livestock — unfortunately there is a very limited market for contaminated land and animals. It is often out of desperation that those suffering from the health and/or economic impacts of chronic exposure to industrial contamination decide to take action. This is the case with Whatmore, who admits that he does not like to “complain,” but is willing to exercise his rights when his family is threatened (Staples Aug 23, 2001, p.E7). Similarly, as will be discussed in greater detail later, Terri Reuser decided to commit herself to an activist role in addressing the rate of MS in Turner Valley only after she was diagnosed with the debilitating disease. More extreme, but nonetheless similarly, Wiebo Ludwig became radicalized once his family and livestock began manifesting health problems such as spontaneous abortions and respiratory difficulties.

Oil and gas companies have made efforts to develop a favourable impression in the community of Rimbey by making financial contributions and devoting volunteer labour to the construction of recreational and entertainment facilities, including a four hundred person auditorium. Such efforts certainly have potential in a remote community of marginal agricultural output to enhance local perceptions of industry. Whatmore believes that favourable views of industry held by some community members appears to have led them to believe that his actions constitute a threat. As Whatmore explains:

There's a few people who figure I should be run out of the country, that the oil companies should have their way. They believe that an

oil company can have no problems, and if I'm having problems, I must just be miserable. That makes me mad. I think they should trade places with me, even for a week. They should come out and drink my water, and come out and breath the air around here (Staples July 23, 2000, p.E8).

Whatmore's concerns reveal that industry contamination, indeed, is not distributed uniformly throughout the community, thus further distorting local perceptions of environmental issues and heightening tensions. This is strikingly similar to Centralia, where certain residents believed evidence of contamination to be sufficiently lacking, and to dismissed the notion that an environmental problem existed. In fact, Couch and Kroll-Smith provide an example reminiscent of Fred Whatmore's situation when they refer to a Centralia resident who abandoned her routine walks to the post-office out of fear of being criticized by former friends who held views different from her own about the dangers of the fire (Couch and Kroll-Smith, p.38).

The community ties that exist in rural communities tend to have a strong effect on the way that environmental controversies are played out. As Rimbej journalist Rob Gilgan points out, the tight-knit nature of this remote community played a role in the divisiveness that ensued from the efforts of some residents to deal with the environmental impacts of industry. Couch and Kroll-Smith write:

Of course, it is true that no community is exempt from environmental dangers, but rural communities are arguably more vulnerable to these dangers than urban municipalities. The smaller the locality, the more dependent residents become on their community's interactional resources; bonds of communal association manifested in emotional intensity, intimacy and mutual exchange (Coleman 1957; Granovetter 1973) (Couch and Kroll-Smith 1994, p.26).

In larger urban centres residents can experience a degree of anonymity.

Similarly, a diversity of economic activity causes many residents in cities to be indifferent to the implications of the various forms of environmental activism undertaken within a given urban area. These factors can then provide a degree of security and/or protection to environmental activists living in urban locations. The increased probability that members of smaller communities are going to be familiar with each other and aware of one another's activities encourages a certain conformity. Undertaking actions that can lead to social tension invites the possibility of altering one's network of social relations (Couch and Kroll-Smith 1994, p.38). This experience can be profoundly alienating and indeed stressful, as it often leads to the formation of opposing groups within communities. These factors act as a disincentive to those wishing to address environmental issues in rural resource regions, and they strongly limit the probability that a given community can effectively resolve the problems stemming from the presence of environmental contaminants.

Conclusion

Social, political and economic forces in rural Alberta place strong limitations on the likelihood that residents will undertake resistance against the oil and gas industry and the possibility that they will receive community support if they do.

Resource dependency in conjunction with political conservatism tends to encourage local politicians and business leaders to deny the existence of environmental and health problems. In some cases it encourages them to

attempt to delegitimize the efforts of local residents to address and resolve such issues. These actions can be particularly alienating in rural communities where the social setting tends to be more tight-knit than in urban centres. The socially corrosive tendencies of environmental disputes stemming from situations of chronic exposure often results in polarization of community residents into separate and opposing groups. Such outcomes serve to accentuate the alienation that may already be experienced by those who are suffering the health and economic impacts of chemical exposures and the possible wrath of other local residents who feel threatened by criticisms of industry.

9. Future Prospects: Changes in Rural Alberta

What has changed is that people are less willing to accept the pronouncements of industry and government that everything is okay. Anyone who lives in rural Alberta knows that everything is not okay.

—Martha Kostuch, environmentalist and veterinarian. (Interview with Andrew Nikiforuk-special to the *Globe and Mail*, January 13, 1999)

Toxic waste sites or hazardous-waste incinerators are commonly proposed by municipal officials in regions of economic decline as a means of generating economic development and increasing local tax revenues. As pointed out earlier, siting disputes generally unite communities in opposition to a perceived unwanted outside intrusion. In oil patch communities it can be difficult to identify situations that could be termed siting disputes because many energy industry proposals occur in communities where the oil and gas industry has already established a presence. However, recent rapid expansion of the oil and gas sector coupled, with the depletion of older reservoirs, has encouraged companies to explore and extract energy resources in communities, or sections of communities, with little prior experience with industry. Moreover, such expansion has brought industry into contact with rural residential regions (essentially bedroom communities of larger cities), suburban communities, and cottage country. In these types of communities, residents are quite likely opposed to the presence of industry because it does not fit in with their conceptualization of the community they have chosen to live in. Such communities are often not already dependent on natural resource extraction activity. A remarkable increase in media attention to sour gas emissions since

the Ludwig affair has also provoked similar community reactions to those of toxic waste siting disputes. Thus it appears that the long struggle of rural residents against the sour gas industry in the province, in conjunction with changing settlement patterns and industry expansion, is resulting in notable progress in terms of community mobilization against this aspect of natural gas production.

Contemporary Sour Gas Issues: The Growth of Community Support for Rural Activism

On March 20, 2001, the EUB issued a highly unusual press release entitled "EUB Denies Critical Sour Gas Well in Rocky Mountain House Area." Strikingly, the well had been proposed by Shell, a company with vast resources and the capacity almost always to ensure favourable outcomes from EUB hearing processes. Nonetheless, the EUB announced in the case of the Ferrier well proposal, located fifteen kilometres southeast of Rocky Mountain House, that "since public safety cannot be acceptably assured, the Board does not believe the drilling of the well, as currently proposed, to be in the public interest" (EUB March 20, 2001). Eric Tait, one of the members of the Clearwater Coalition, the grassroots group that had organized in opposition to the proposed well, had made calculations based on the EUB's previous record of approving energy industry applications that the group had a one in a hundred chance of securing a favourable outcome (Michelin March 31, 2001). However, this case involved significant and determined mobilization of area residents, some of whom — including veterinarian Martha Kostuch — have considerable experience

negotiating claims against the oil and gas industry. Similarly important, however, the resistance put up by the Clearwater Coalition received notable press coverage due to a considerably increased awareness and concern with sour gas issues in recent years at the local, provincial, and national levels. Heightening the media scrutiny of the case was the airing of the National Film Board's documentary "Worst Case Scenario" on the CBC's *Nature of Things*, covering the Clear Water Coalition's efforts to block the proposed well. The documentary was shown prior to the EUB's decision, so it is entirely possible that it played a role in shaping the Board's decision not to approve the well. If this is the case, then perhaps the Ferrier well proposal is just an anomaly, since most future energy industry applications will not receive national press coverage. However, at an early screening of the "Worst Case Scenario" in a community hall outside of Rocky Mountain House in the depths of winter — and in the heartland of Alberta's Conservative Bible belt region — over five hundred people showed up, many from rural regions across the province. The attendance at the event and heated criticism of the government's support of the sour gas industry voiced by those present indicates that widespread critical concern is uniting rural Albertans in opposition to sour gas applications (Kennedy Feb 2, 2001).

As previously discussed, rural residents who decide to speak out or take action against the practices of oil and gas companies often do so as a result of experiencing negative health and/or economic effects. In many cases, such actions are limited to addressing immediate issues of concern. However, there are those who, in their efforts to address issues, decide to reach out to a wider

community of people negatively affected by oil and gas activity. These people may come to embrace a wider conception of the issue that does not just concern their own immediate struggles. Mitch Bronnaugh makes the observation that farmers in Alberta are increasingly defying the strong, silent stereotype and are talking to one another about their experiences with oil and gas companies. He also points out that “their (farmers) traditional fatalism in the face of oil companies is eroding” (interview, telephone, August 14, 2000). The example of the packed town hall outside of Rocky Mountain House indicates that there is a larger community of engaged people who are willing to go beyond attending their own hearings or court dates in their struggle against industry.

Particularly telling in relation to a growing perception within rural Alberta that there is a wider community struggling with impacts of the oil and gas industry is the recent formation of a group called *Survivors of Sour Gas*. On October 15th, 2000, at a community hall on the outskirts of Calgary, a group of people, some from as far away as Manitoba, proposed the formation of a victims’ group for those struggling with the effects of sour gas developments. The organizer of the group is Rose Balcom, who, shortly after moving on to an acreage north of Calgary with her husband, discovered that the water was too polluted to drink. In trying to resolve the problem, they discovered that the regulators were incapable of providing assistance. The feelings of abandonment felt by Balcom compare with those of others in the group who have witnessed health problems in livestock or their children suffering with debilitating neurological disorders after a sour gas knockdown experience. It is a common experiential bond that brought

these people together in a support group for victims of sour gas. The feelings of frustration and doubt experienced by these people are captured quite profoundly in Rose Balcom's presentation to the group, in which she described her own reaction to her struggles:

This is not the country that I was born in. This is not the country that I thought I had the right to live in good health and in security, without fear, without fear of reprisal, without fear of intimidation, that it could somehow come back, affect my health, affect my family's health, or affect me financially if I did speak up. But sadly, this is a reality that some people have endured in this country on a personal basis (Korchinski Oct 15, 2000, p.7).

The coming together of people from a vast geographic region encompassing most of the prairies, to provide support for each other in coping with their suffering inflicted by oil and gas companies, indicates that they at least are no longer willing to accept the presence of a polluting industry without at least voicing their concerns.

Activist Profiles

A short discussion of individual activists will further provide a picture of how some residents are addressing the practices and impacts of the oil and gas industry that are affecting rural regions in the province. This will shed light on some of the approaches being utilized by activists in their struggles. It will also show how these tactics hold the potential to alter the way that institutions such as regulatory bodies, health authorities and even professions like epidemiology, approach environmental and health issues related to the impact of industry.

Compensating for the Medical Community: Citizen Activism and Turner Valley's MS Cluster

Terri Reuser lives on a ranch outside of the town of Turner Valley. A sour gas flare is located five hundred metres away from her family's residence. While working at the Oilfields General Hospital in Turner Valley, Reuser began to take notice of the high frequency of patients with MS, a progressive, degenerative and fatal disease of the central nervous system. She also noticed that there were an inordinate number of local residents suffering from brain tumours and cancer. A couple of years ago, some of her co-workers were diagnosed with MS. Then Reuser was diagnosed herself, after enduring misdiagnoses following the development of vision problems in 1995. After Reuser received her diagnosis, she decided to research the possible environmental causes of the seemingly high prevalence of MS in the region. This led to many discoveries such as the fact that the Oilfields General Hospital is located on a former oil and gas site. She noticed that a remarkable number of residents living in the neighbourhood just downhill from the hospital were suffering from various neurological conditions (interview, telephone, July 6, 2001).

Reuser has experienced considerable difficulty encouraging local doctors to take an active interest in addressing the possible sources of the health problems she has observed in the region. Consequently she turned to the MS clinic in Calgary for assistance and informed the staff there that she believed there was an MS cluster in the area. Their initial response was to deny that there was an MS cluster; however, according to Reuser, the clinic has since been

more responsive. Also, since Reuser initially undertook her efforts, the Headwaters Health Authority, which encompasses a section of the eastern slopes region including the Turner Valley/Black Diamond area, has undertaken a review of the prevalence of MS in the area. This review was undertaken on the urgings of Reuser and her colleagues, including a concerned local doctor and a number of other area residents (interview, telephone, July 6, 2001). The review noted that there was a prevalence of 354 cases per 100,000 in the health district. That compares to 313 per 100,000 in the whole of Alberta; and Alberta has the highest rate in Canada with its national rate of only 74 per 100, 000. A local doctor has estimated the prevalence in Turner Valley/Black Diamond to be 400 per 100,000, giving the communities possibly the highest rate of MS in the world. Reuser has also been effective in causing the regional health authority to agree to undertake a further in depth study of the nature and causes of the MS cluster in the region (Korchinski Feb 28, 2000, p.1). The date of initiation of this research and its precise focus and scope are still unknown.

In her effort to identify and address the possible sources of the MS cluster in the Turner Valley area, Reuser has focused on raising awareness of the issue. She has done this by encouraging health authorities to look into the matter further, along with organizing meetings for area residents, providing the opportunity to discuss the possible links between gas flaring and MS. She has also undertaken her own research into the environmental causes of MS. Reuser has done this research with a co-worker and a friend and will be submitting a paper entitled "Environmental Factors of Multiple Sclerosis" for publication at a

later date. In conducting this research, they have scoured international research on the etiology of MS. Reuser has taken these steps because she has become convinced that there is an environmental source of the health problems in the area. She is also quite certain that the environmental source stems from both past and present oil and gas industry practices. Reuser notes that the water supply for the area runs past an old flare pit that the EUB has thus far refused to have cleaned up. Incidentally, her experiences with the EUB have caused her to become critical of its capacity to help residents suffering from the impacts of oil and gas activity. She has also become critical of medical authorities and scientific researchers, who are generally either uninterested in assessing the environmental causes of health problems such as MS, or are fixated on finding a precise cause and effect connection. This is an understandable frustration in a community like Turner Valley, which is in a classic chronic exposure situation and where there exist numerous different sources of contamination. The search for a precise cause and effect is invariably going to be elusive here, thus this endeavour will be ultimately more supportive of the position of industry than that of the concerned residents who are convinced that their health problems are related to industrial contamination. Reuser explains her impressions about the medical research community: "The problem is with science itself. Their research is inadequate and the lay people know this" (interview, telephone, July 6, 2001).

On the Theory of Popular Epidemiology

In the past few decades there have been a number of sociological analyses into the limitations of traditional forms of epidemiology in adequately addressing the environmental causes of diseases arising from exposure to industrial contaminants. Steve Wing argues in "Limits of Epidemiology" that the field's contribution to understanding public health problems is constrained by its obsession with "universal exposure-disease relationships" (Wing 1994, p.1). Wing believes that this rather exclusive focus prevents traditional epidemiology from acknowledging the contexts within which exposures to sources of diseases occur. Wing explains this problem as follows:

Public health interventions narrowly focused on exposure-disease relationships cannot address the more important public health effects of the industries and social arrangements that produce exposures studied by epidemiologists (Wing 1994, p.1).

Wing consequently argues for an integration of social and historical considerations into the analyses of epidemiologists, who are now predominantly affected by a Cartesian reductionism that considers health factors in isolation from their contexts. This, he believes, requires going beyond addressing factors such as microbes or even chemicals and genetic considerations to introduce variables of race and/or socioeconomic status (Wing 1994, p.2).

Phil Brown, also an observer of the limitations of traditional epidemiology, utilizes the term "popular epidemiology" to describe how lay people with intimate knowledge of exposure situations are practicing and formulating a more socially rooted form of epidemiology. He explains that participation in forms of "popular

epidemiology” is usually undertaken by toxic waste activists who are motivated by the desire to resolve problems that are not adequately dealt with by the scientific community. For instance, in *No Safe Place: Toxic Waste, Leukemia, and Community Action* Brown and Edwin Mikkelsen analyze ways in which residents of Woburn, Massachusetts, identified a cluster of leukemia emanating from carcinogens leached into the local water supply from toxic wastes produced by W.R. Grace and Beatrice Foods. Using his knowledge of this case and others, Brown has articulated the concept of “popular epidemiology”. Those engaged in popular epidemiology initially detect and then subsequently act on environmental diseases. After identification of a problem, the process usually entails a search for rates and causes of disease, much like the efforts of Terri Reuser. The participation of lay activists in efforts to identify health clusters and their causes is valuable to health professionals who are open to the notion that non-experts can make a valid contribution to medical knowledge; this is because lay people have intimate knowledge of local environments, knowledge that is generally inaccessible to health researchers (Brown, Mikkelsen 1990, p.127). On this point, Couch and Kroll-Smith also believe that there is “the possibility that local or contextual knowledge, is necessary to a scientifically valid way of knowing” (Couch and Kroll-Smith 1997, p.190). However, they explain that “local knowledge, in the forms of past experiences, daily routines, perceived relationships (between, for example, animal behaviours and herbicide spraying) is routinely dismissed as anecdotal by scientists and medical researchers” (Couch and Kroll-Smith 1997, p.190). Lay activists affected by exposure to toxic

chemicals also have heightened motivations (including social or communal, economic, emotional and familial considerations, along with frustration with the indifference or insensitivity of resource and health bureaucracies) to search into social and economic causes of diseases.

Popular epidemiology is initiated by concerned citizens and/or activists, but it often involves the participation of professional researchers. Brown elaborates on the concept and the processes that inform it:

Popular epidemiology is the process by which lay persons gather scientific data and other information, and also direct and marshal the knowledge and resources of experts in order to understand the epidemiology of disease. In some of its actions, popular epidemiology is more than public participation in traditional epidemiology, since it emphasizes social structural factors as part of the causal disease chain (Brown and Mikkelsen p.126).

The efforts of those engaged in processes that can be termed “popular epidemiology” also diverge from the work undertaken by professional researchers, to the extent that most professionals do not become political activists in order to implement their findings. Along these lines, the review by the Headwaters Health authority, which identified the prevalence of MS in the region, occurred only after a concerted effort by Reuser and other community residents to research and then raise public and professional awareness of the issue. These are highly political actions in rural resource communities. Reuser’s actions thus constitute a sort of popular epidemiology because she has worked to identify rates of MS in the Turner Valley region and is subsequently conducting research into potential environmental causes of the disease cluster. Her knowledge of the people and socio-economic context of the area has further encouraged her to

look into the possibility that oil and gas activity could be the source of the health crisis in the area. She is still involved in a campaign with other area residents to find alternatives to gas flaring in Turner Valley (Beckett March 7, 2001). Dr. Swan of the Headwaters Health authority has explained to the media that there is not enough evidence to conclusively link hydro-carbon exposure to MS.

Nonetheless, he does confess that "it's a plausible hypothesis but we need proof" (Beckett March 7, 2001). Swan has asked for provincial involvement in efforts to deal with the problem of MS. He has also asked that a provincial registry of MS patients be set up (Beckett March 7, 2001). It is difficult to imagine that these efforts would have been undertaken without the prior work and pressure from Reuser and other concerned members of the community.

Activists and Expert Knowledge: Taking Back Populism

In 1999, Petro-Canada made an almost inconceivable decision by agreeing to upgrade the rate of sulphur recovery at its grandfathered gas plant at Wilson Creek. Phil Hanneman and Mitch Bronnaugh, consultants for landowners who launch claims against industry, were representing seven intervenors from the area, including Fred Whatmore. These intervenors were objecting to Petro-Canada's application to increase the plant's productive capacity through the installation of three new compressors (Seskus June 17, 1999). Petro-Canada's application to increase its productivity represents the only means available through the EUB regulatory channels to petition a grandfathered gas plant to upgrade its sulphur recovery rate. Hanneman, Bronnaugh and their clients

shrewdly used their knowledge of the EUB regulatory process to establish a highly significant precedent. In fact, the precedence of this outcome, which attracted considerable media attention, has the potential to affect the fate of the other sixty remaining grandfathered gas plants, which account for approximately thirty-two percent of sulphur emissions in the province. It should be noted, however, that an eighty-five percent sulphur recovery rate is by no means ideal, but it is certainly an improvement from the seventy percent rate the plant has been operating at.

Forcing the oil and gas industry to change the way it operates in the social and political context of Alberta is a formidable task. To do so through conventional means such as negotiating with companies and/or resolving issues through public hearings set up by the EUB is an almost incomprehensible goal. Resource dependency in rural communities, a political and cultural ethos that equates petroleum resources with prosperity, a pro-development regulatory apparatus, and oil and gas companies which can hire legal, environmental, and technical experts to support their position, can all conspire to make the process of openly questioning and challenging industry practices an intimidating experience. Nonetheless, Hanneman and Bronnaugh have had a notable amount of success working together to assist residents in Alberta with grievances against oil and gas companies. They undertake their efforts with a surprising degree of confidence, even though Hanneman has endured such intimidations as an attempt by a company's hired security guard to throw him out of a public meeting,

and being investigated and placed under twenty four-hour surveillance by the RCMP (interview, telephone March 3, 2001).

Hanneman and Bronnaugh have done much to raise awareness throughout the province of the health, safety, and environmental implications of oil and gas activity, as a result of their effectiveness in representing clients, and also due to their willingness to speak regularly and candidly to the media and to assist journalists in gaining exposure to social and environmental conditions in rural regions. Their success has been largely contingent upon their capacity to understand the intricacies of the EUB's regulatory process and to become intimately acquainted with expert knowledge of industry practices such as flaring, waste disposal, the construction, operation and maintenance of pipeline systems, and the potential health, environmental and economic impacts of these activities. Hanneman's and Bronnaugh's efforts are informed by a conception of the public interest that acknowledges the importance of environmental and community health and sustainability. It also includes, and indeed respects, rural residents who may not be economically powerful or engaged in highly productive or profitable agricultural enterprises. Thus their efforts to address the impacts of oil and gas activity are influenced by a sort of populist appeal to the interests of rural residents, which stands in stark contrast to the post-1947 populism of conservative politicians and the business class in Alberta.

Hanneman was raised in close proximity to sour gas facilities in an agricultural community in the eastern slopes region north of Calgary. Like other activists, he gained motivation to undertake his work partly as a result of

exposure to harmful industrial emissions. In his case, the exposure was to hydrocarbon emissions, which he believes caused him to develop asthma.

Consequently, he has a strong desire to see oil and gas companies operate in a fashion that does not jeopardize human and environmental health. Bronnaugh explains that his motivation for assisting clients in claims against the oil and gas industry stems in part from the fact that such work entails a great deal of learning, and also because he believes that "it doesn't seem right when people are run over by big companies that are making far more money than they should" (interview, telephone, July 3, 2001).

Activists engaged in struggles with the oil and gas industry in Alberta are generally not doing so as part of a larger social movement. In fact, Bronnaugh disavows the title environmentalist, and Hanneman points out that you do not see many groups such as Green Peace going out into rural Alberta. Hanneman prefers the term "farmers' advocate," but I get the sense that categorization according to labels is not applicable to their way of conceptualizing their efforts to address the impacts of industry activities (interview, Rimbey, August 19, 2000). Despite Hanneman's and Bronnaugh's reservations about traditional environmentalism, Couch and Kroll-Smith's study of environmental movements, which they defined broadly enough to encompass activist operating at the local level, is helpful in providing theoretical context to this analysis. In their 1997 study, "Environmental Movements and Expert Knowledge: Evidence for A New Populism," Couch and Kroll-Smith argue that increasingly:

People believing they are endangered by the production, use, and disposal of toxic materials are fusing a moral appeal to safe

environments with a popular appropriation of expert knowledge. This is designed to make a particularly persuasive claim on institutions to change or modify their behaviors and policies (Kroll-Smith, Couch, and Floyd 1995; Couch and Kroll-Smith 1997, p.186).

A growing sense of confidence and an increased familiarity with the public hearing process by rural Albertans have led to changes in the EUB. Outside of the example of Wiebo Ludwig, those challenging the practices of the oil and gas industry in rural Alberta have been doing so within conventional institutional structures such as the EUB, and in some cases the law courts. These efforts, together with a general growing awareness of rural frustration with industry impacts, have served to alter how the EUB hands down decisions in hearings. Although the EUB's pro-development stance has not been noticeably changed, it is currently more likely than in the past to attach conditions to its decisions in order to address the concerns of intervenors (for example, forcing a company to utilize directional drilling in order to choose a location more desirable to potentially affected residents) (interview, telephone, July 9, 2001; interview, July 3, 2001). Bronnaugh believes the Board's increased tendency to add conditions to industry applications — which often are quite costly — has caused companies to be more reluctant to go through the public hearing process once intervenors have filed an objection. This, in turn, gives concerned residents more leverage in negotiations that occur with companies outside of the formal hearing process. Consequently, potentially impacted residents are gaining a sense of confidence in their ability to stand up to companies after they file an application. Bronnaugh estimates that concerned residents who use the official channels of the EUB

have cost the industry considerably more money than did Ludwig. Hanneman and Bronnaugh now use the tactic of objecting to any application submitted to the EUB until it can ensure that it is safe. Apparently, landowners are becoming increasingly receptive to this approach (interview, telephone, August 14, 2000).

Conclusion

The formidable barriers to effective resistance against the oil and gas industry in rural Alberta are being made to appear malleable by the efforts of those unwilling to accept the "pronouncements of industry that everything is okay" (Nikiforuk Jan 13, 1999). A determination to seek changes through conventional channels such as health and resource bureaucracies is forcing such bodies to address health and environmental impacts of the oil and gas industry. This is demonstrated through the efforts of Terri Reuser in pressuring medical authorities to address the MS cluster in region of Turner Valley/Black Diamond. It has also been made evident by the ability of Mitch Bronnaugh and Phil Hanneman to manipulate public hearing processes so as to make the EUB more responsive to a definition of the public interest which encompasses concerns other than those that are strictly economic. The willingness of those concerned about the impacts of industry to raise awareness of environmental and health problems through channels such as the media and town hall meetings, but also through organizations such as victims' support groups which seem out of place in the social setting of rural Alberta are highly significant examples of a changing relationship between rural residents and the oil and gas industry in the province.

9. Conclusion

Redefinitions of Public Interest: Their Influence in Light of Remaining Challenges

As shown in this text, since the 1960s, various actions undertaken by rural residents in Alberta have called into question the contribution of the oil and gas industry to the public interest. There are now increasing numbers of rural residents who are actively struggling to minimize the health and environmental impacts of petroleum production. In doing so, some of these residents are also equipping themselves with knowledge and discourses formerly considered the preserve of experts or professionals. In some instances, these citizen activists are causing institutions such as the EUB and regional health authorities to address their concerns more seriously. Consequently, it is apparent that a new definition of public interest has been formulated and articulated by some residents in rural Alberta. This definition questions the legitimate contribution of the oil and gas industry to the public interest.

Despite the determination of growing numbers of rural residents to challenge practices of the petroleum industry, there are considerable challenges faced by those who undertake such efforts. At the political level, the provincial Conservative Party has undertaken some overtures, such as setting up multi-stake holder committees to investigate concerns expressed about the impacts of oil and gas production. However, these committees have not addressed the issue of chronic low-dose exposure to sour gas. Moreover, there have not been

significant increases in funding to the EUB, which would allow it to monitor and inspect industry practices more rigorously.

Despite the current prosperity in Alberta, the provincial economy has failed to undergo significant diversification (Anielski 2001, p.9). Thus there is a widely held perception in Alberta that the province's prosperity is dependent upon the oil and gas economy. This prevailing dependence on oil and gas resources suggests that there is still considerable incentive for residents of the province to emphasize the importance of the petroleum industry in the conceptualization of public interest. At the rural level the importance of oil and gas extraction to local economies has been accentuated in recent decades by structural changes in the agricultural economy, which have made it increasingly difficult for small producers to maintain their operations. Therefore, even with increased awareness of the environmental and health impacts of petroleum industry practices it is highly likely that when residents attempt to address industry impacts in rural regions social tensions will increase and community members will polarize into opposing groups.

Although formidable challenges remain for those who are willing to address the impacts of oil and gas production, there is reason to believe that industry impacts will be addressed more effectively in the future. Of particular importance in this regard is the cumulative impact of the willingness expressed by rural residents to take action against oil and gas companies. The increased media exposure of oil and gas disputes raises the likelihood that growing

numbers of rural residents will feel compelled to address the environmental and health impacts of oil and gas activity.

Rural Alberta is currently undergoing social and economic changes that may increase the likelihood that more residents will be unwilling to accept the polluting practices of oil and gas companies. Growing numbers of people are leaving the province's cities and are settling in rural residential communities. In recent years, efforts by the natural gas industry to gain approval for drilling projects in Strathcona County outside of Edmonton, and to develop gas reserves north-east of Calgary, have been unsuccessful (Hryciuk June 20, 2000). Interestingly, Greg Gilbertson, chief communications officer for the EUB, explains that one of the more significant foreseeable challenges facing the Board is the management of conflicts that will arise in rural residential communities (interview, telephone, July 9, 2001). This is understandable since most of the residents settling in these communities are presumably not accustomed to living in close proximity to oil and gas facilities.

Reflections on Research: Assessing its Significance

I have traced the development of a definition of public interest in Alberta, which was founded on a recognition of the importance of economic growth through the extraction and processing of energy resources. The question guiding this research was: "What are the difficulties implicit to a redefinition of public interest in rural Alberta?", and I answer this through an exploration of the socio-economic and political repercussions of the province's dependency on economic

development via petroleum production. As a result of the province's resource dependency, many Albertans are concerned about the potential economic implications of criticizing or challenging the practices of oil and gas companies. Those who do confront such fears and take action to address the impacts of oil and gas production face further obstacles from the province's conservative political environment. The province's regulatory agency can also act as an impediment to efforts aimed at addressing the negative impacts of oil and gas activity, because it has been historically shaped by an assigned task of promoting resource development rather than the protection of human and environmental health. Hence, I contend that oil and gas development has shaped commonly held perceptions in the province about the legitimacy and effects of criticizing petroleum companies. This development has also affected the political culture and regulatory institutions in ways that limit the extent to which public interest can be redefined.

The historical section of this study draws attention to the fact that, from the beginning of oil and gas exploration in the west, petroleum resources were perceived as a great hope for achieving economic prosperity and diversity. Through further exploration of this historical reality I focused attention on the development of populism, which I believe has shaped conceptions of public interest in Alberta and thus has influenced environmental and health controversies surrounding oil and gas. Both Social Credit and Conservative governments have courted populist constituencies that have established a tradition of criticism of economic and political elites. The interpretation of

populism presented here attempts to build on Larry Pratt's and John Richards' interpretation of populism developed in *Prairie Capitalism* by tracing its development through the latter half of the twentieth century. I argue that, since the discovery of oil at Leduc in 1947, provincial governments have formulated and articulated a more narrowly defined form of populism which fosters a distrust of politicians in Central Canada yet refrains from critiquing economic forces. This rendition of populism emphasizes Alberta's wealth and autonomy and the need to protect them from Central Canadian politicians. Criticism of economic elites, particularly large oil and gas companies, is not evident in manifestations of this version of populism. Criticism is, in fact, diverted away from large oil companies (many of them foreign owned) toward the federal government, which is consistently identified as the primary culprit responsible for siphoning off the province's wealth in contemporary expressions of populism. Consequently, there is little room in official political discourses in Alberta for the criticism of oil and gas companies that are responsible for extracting a significant proportion of the province's non-renewable resources and for contributing substantially to environmental pollution. The narrowing of populism to a critique of the federal government and a celebration of the province's natural resource wealth represents a significant challenge to a redefinition of public interest

My analysis of efforts at resolving environmental and health disputes at the community level has been given theoretical context through an application of theories developed by resource sociologists. William Freudenberg's conceptualization of the addictive qualities of economic development based on

resource extraction has been particularly helpful in assessing the contribution of resource dependence to environmental controversies. As a result of resource dependency, local politicians and many residents of oilpatch communities find it difficult to accept criticisms of or challenges to the practices of oil and gas companies. This is because residents of such communities are led to fear that such criticism constitute a threat to their own economic security along with the economic prospects of their community. Stephen Couch's and Steve Kroll-Smith's conceptualization of the social divisions which develop in communities affected by disputes arising from chronic exposure to industrial contaminants provides further support to my discussion of the social polarization occurring in communities struggling with the impacts of oil and gas development. Couch and Kroll-Smith insightfully explain that exposure to contamination is not experienced uniformly throughout such communities. This, in turn, results in some community residents failing to understand or have sympathy for those who seek to address the impacts of exposure situations.

The two case studies of activists operating in rural Alberta helps contextualize some of the approaches used to address the impacts of oil and gas companies. Phil Brown's conceptualization of popular epidemiology contributes a great deal to my understanding of the efforts made by some residents in Turner Valley to research the high prevalence of MS in the area and to lobby the regional health authority and the EUB to address the problem. Couch and Kroll-Smith's analysis of expert knowledge and environmental movements contributed theoretical support to my analysis of citizen activists who have acquainted

themselves with specialized knowledge of the mechanical engineering literature on industry processes in order to address their impacts. Couch and Kroll-Smith describe how the use of expert knowledge by citizen activists represents a new manifestation of populism. This, in turn, enabled me to discuss how some activists in Alberta are beginning to reappropriate populism, as their efforts are often undertaken in defence of those with minimal economic and political resources, against powerful economic entities and political decision makers.

Significance of Research

By bringing together theoretical concepts from resource and medical sociology to a study of the political economy of the oil and gas industry in Alberta, I have aimed to provide an original analysis of the environmental issues in rural and resource producing regions. My use of both sociological and political economic analyses was necessary in order to analyze the social tension surrounding oil and gas production in Alberta. It is my hope that this study holds relevance to other regions in Canada, the United States and other parts of the world that are shaped by resource industries. Further, I hope it may make a contribution to Canadian political economy by drawing attention to the importance of the environmental disputes that surround the political economy of resource industries.

It is important to note that the emergence of rural resistance in Alberta during the 1960s coincided with growing environmental awareness internationally. The main issue being addressed at that time was emissions from

large gas plants. There are now many more rural residents challenging oil and gas activity than there were during the 1960s, and these people are attempting to resolve a wider array of environmental issues related to oil and gas production. Increasing environmental awareness in recent decades has also been accompanied by a growing tendency for rural activists to utilize a diversity of knowledge forms in order to protect themselves from industrial pollution. Their willingness to use such forms of knowledge indicates that these residents are deeply committed to redefining the public interest. The struggles of these rural residents can be viewed as a reappropriation of populism because they are undertaken as a means of defending those with minimal economic and political resources against the effects of decisions made by those with considerable political and economic resources.

Fig. 1. Principle sour gas producing areas in Alberta, including affected communities discussed in this study (adapted from the Petroleum Communication Foundation's *Sour Gas: Questions and Answers*, October 2001).

Appendix A

Notes on Method

In acquiring substantive material for this study I utilized a combination of primary and secondary documents. I also conducted field research.

Key Substantive Sections

Interviews

I received clearance to conduct interviews from the Carleton Ethics Committee. Interviewees were issued a consent form that allowed them the option of choosing to remain anonymous in the research. The interviews and informal conversations I engaged in proved to be a wealth of knowledge in gaining an understanding of the complexity of issues surrounding the oil and gas industry in Alberta.

I undertook a combination of in-person and telephone interviews in conducting this research. Interviews took place over the course of a year from August 2000 until July 2001. I conducted ten formal interviews and had engaged in twice as many informal conversations. I interviewed concerned rural residents, journalists, academic researchers, mechanical engineers, and representatives from a number of government departments and bodies including the EUB and the Surface Rights Board. Interviewees were chosen based on their experience with issues related to oil and gas activity in rural Alberta. Interview questions were generally based on the kinds of knowledge that given interviewees had of

the subject matter. For instance, concerned residents were asked how they prepared for public hearings, while representatives of government bodies were questioned about specific regulatory standards. By choosing a wide range of different social actors I aimed to gain a comprehensive understanding of the various aspects of the social tension surrounding oil and gas production in rural Alberta.

I had numerous informal conversations with rural residents. Many of these discussions were informal because I learned quite quickly that some rural residents can find it intimidating when someone they do not know pulls out a tape recorder and asks them to sign a consent form. Although some rural residents are quite willing to sign a consent form many prefer informal discussion. In the case of informal discussions I did not use any of the information I obtained directly in my thesis. However, I derived a strong sense of the issues faced by the individuals I had such discussions with; this, in turn, helped to me focus and/or redirect my research.

Communities Researched:

Rimbey was chosen as a site of field research due to the fact that it is an agricultural community in the eastern slopes shaped by a long history of intensive oil and gas production. There have also been numerous disputes between area residents and the oil and gas industry in recent years. In the Rimbey area I had interviews and conversations with residents along with observing industry practices and their environmental impacts.

I also undertook an analysis of Turner Valley. This consisted of conducting telephone interviews along with reading historical studies and media reports of industry activity and impacts in the area. I devoted attention to Turner Valley because of the long history of industry activity in the area and the current activism undertaken by some local residents to address the cluster of MS in the region.

Industry Practices

In order to understand specific practices of the petroleum industry I used documents from mechanical engineering journals and from industry organizations such as the Canadian Association of Petroleum Producers (CAPP), and the Petroleum Communications Foundation. I also referred to documents issued by the Alberta Energy and Utilities Board (EUB). Documents from the Alberta based Pembina Institute were also used in this section. I also undertook my own field work, which consisted of travelling through the Rimbey region while observing and photographing energy industry facilities.

Health Impacts

I referred to articles from medical journals to understand the health impacts of industry practices. I also referred to animal toxicology studies. Documents issued by the Pembina Institute, CAPP and the Petroleum Communications Foundation were also used in this endeavor. Newspaper articles were used in this effort.

In my field research I had discussions with rural residents about human and animal health impacts of oil and gas activity. I also conducted interviews with a number of people who have suffered what they perceive to be health complications from exposure to flaring emissions and other practices.

Environmental Impacts

I used documents published by the Pembina Institute in conjunction with newspaper articles for this section.

I also conducted my own field research in the Rimbey region inspecting and photographing groundwater contamination, flaring emissions, sumps etc.

Appendix B

Consent Form

Purpose of the Consent Form:

A consent form is intended to outline your rights as an interview subject and to help explain the purpose of the research you are contributing to. I will retain a copy of the consent form and you may keep a copy for your own records.

Statement of Research:

You, the undersigned, are being invited to participate in the research process for a Master's thesis on the social tension, both current and historical, surrounding the oil and gas industry in Alberta. This thesis, which will focus on environmental and health issues related to petroleum industry practices will be made public through the Carleton University library. The project may also be published in book or article form.

Contact Information:

For further information on this project, please contact,

Researcher—Colin Lund,

(613) 569-0232 or (780) 434-7389, email: clund@chat.carleton.ca

Thesis Supervisor—Prof. Laura Macdonald,

(613) 520-2600 ext. 2787, email: laura_macdonald@carleton.ca

If you have concerns about any aspect of this study, you may contact Department Chair (Institute of Political Economy), Prof. Rianne Mahon,

(613) 520-2600 ext. 8858 email: rmahon@ccs.carleton.ca

Potential Risks:

It is my belief as the researcher that there are no potential physical, emotional, psychological, financial, social or any other risks associated with the research process. However, some of the questions I would like to ask may be related to your occupations(s) or to sensitive social issues in your community. Therefore it is important that you carefully read the set of sample questions and this consent form. This should allow you to assess whether or not you perceive any potential risks, or anticipate possible anxiety or discomfort that may arise from the interview process. Whether or not you perceive any risks it is important that you understand your rights as an interviewee and the process for requesting and ensuring anonymity as outlined below.

Interviewee's rights:

As an interview subject you can stop the interview at any time. You may also decline to answer any question(s).

Process for ensuring anonymity:

- each interview subject will be transcribed and given a code.
- a record of the coding will be kept in the thesis supervisor's locked office.
- any recordings of interviews will be similarly coded. These will be stored in a locked filing cabinet in my office.
- any records of the interview will be destroyed at the conclusion of the research.

Request for anonymity:

☐ I _____ wish to remain anonymous.

☐ I _____ do not wish to remain anonymous.

Agreement to participate in the research process:

Name of the interview subject (print)

Signature of the interview subject

Signature of researcher

Date

Glossary

Abandonment- The permanent deactivation of a well, pipeline or seismic hole.

In the case of a seismic hole, this involves ensuring that it is capped in such a way that there is no chance of damage to groundwater. In the case of an abandoned well, it means any well where porous and permeable hydro-carbon and/or water bearing formations have been effectively isolated through the placement of cement caps. Well abandonment also includes removing the wellhead, cutting the casing off at a depth of 1 metre below ground surface and welding a steel plate across the opening. Abandonment means ensuring there is no potential for damage to the oil and gas remaining in the ground or for the oil or gas to contaminate groundwater. In the case of a pipeline, abandonment means the permanent deactivation of a pipeline or part of a pipeline, whether or not it has been removed.

Battery- An assortment of tanks and/or facilities found in oil and gas fields that store or process petroleum. Such facilities receive the products of extraction from one or more wells prior to the delivery to market, and may include equipment for separating the product into oil, gas or water.

Bitumen- A heavy form of petroleum that exists in the semi-solid or solid form in oil deposits. This is the type of oil that is found in the oilsands located primarily in northeastern Alberta.

Blowout- An uncontrolled flow of oil, gas, water, mud or other fluids from a well into the atmosphere.

Blowout Preventer- A device that can be installed on wells to control pressures and reduce the likelihood of fluid release during drilling, completion or maintenance operations.

Board- Known since 1994 as the Alberta Energy and Utilities Board (EUB), but formerly referred to as the Alberta Energy Resources Conservation Board (ERCB), the Petroleum and Natural Gas Conservation Board (PNGCB), and the Oil and Gas Conservation Board. The board in its various phases, since its inception in 1938 following the passing of the *Oil and gas Conservation Act*, has functioned as the chief regulator of the oil and gas industry in the province.

Critical Sour-well- A well is designated as a critical sour well if releases of sour gas could affect nearby residents. The designation reflects the proposed well's proximity to an urban centre and its maximum potential hydrogen sulphide release rate during the drilling stage. The casing flow or open-hole flow configuration is assumed in arriving at this designation.

Drilling Mud- Fluid circulated down the drill pipe (and up the annulus) during drilling to remove cuttings, cool and lubricate the bit and maintain the desired pressure in the well. Drilling mud in Alberta can contain toxic ingredients. A common type of mud used in the province is 'invert mud' which contains diesel along with other hydro-carbons and often heavy metals. Invert mud is used when there is a risk of encountering a water sensitive subsurface rock formation while

drilling. Less toxic, but moderately more expensive, alternatives to invert mud such as mineral and canola oil are available.

Elemental- A pure substance existing in its simplest state. That is it is not processed or co-existing in combination with anything else.

Emissions- Gaseous material released to the atmosphere either by industrial processes (i.e. through extraction, processing, or transportation), or via natural means.

Emergency Planning Zone An area surrounding a well where residents or other members of the public may be at risk in the event of an uncontrolled release of hydrogen sulphide and the company operating the well must be prepared to respond accordingly.

Flare pit (pit flare)- An Earthen pit where excess (not immediately marketable) gas extracted while drilling may be burned.

Field- An area of the ground's surface underneath which lies a pool or reservoir of oil and/or gas.

Flaring- Flaring is the burning of unwanted gases from a well or processing facility. It may be routine or occur due to an upset. The two common types of flaring are well test flaring and solution gas flaring. *Well Test Flaring* is carried out when a new well is drilled, to burn off gases while the chemical content of the gases is being tested. *Solution Gas Flaring* occurs at batteries or wells where one or more wells is processed and stored. Flaring is sometimes necessary at temporary stacks, as part of pipeline maintenance operations. *Gas Processing Plants* use flares to burn off gas for which there is no market (under current

conditions sales would not be profitable) and to burn off gas during emergency conditions.

Gas (Natural Gas)- Raw gas or marketable gas, or any constituent of raw gas, condensate, crude bitumen or crude oil, that is recovered in processing and is gaseous at the conditions under which its volume is measured or estimated.

Gas Cap- The portion of an oil-producing pool that is composed of free gas.

Gas-Cap Drive- The drive mechanism by which oil is extracted through the expansion of gas in a cap situated above the oil in a reservoir.

Gas Injection- A process that requires the high-pressure injection of gas into an oil-producing pool to increase the drive of the reservoir and enhance the recovery of oil or the amount of crude extracted.

Gas Processing Plant- A facility where gas from numerous pipelines is collected so that water, hydrogen sulphide (in the case of sour gas), carbon dioxide and natural gas liquids can be separated from the gas before it can be transported to markets. Sulphur is often separated at processing plants and subsequently marketed primarily for the production of fertilizers but also for the manufacture of paper, pharmaceuticals and other products. Hydrogen Sulphide that is not used in the manufacture of sulphur is flared or incinerated with combustion converting most of it to sulphur dioxide. The sulphur dioxide is released into the atmosphere.

Glycol Dehydrator- A facility built to remove the water that occurs in some natural gas in order to prevent the corrosion and freezing of gas pipelines.

Groundwater- All water under the surface of the ground.

Hearing- A process used by the Alberta Energy and Utilities Board, the Surface Rights Board and other similar regulatory bodies to listen to evidence before deciding an issue.

Hydrogen Sulphide (H₂S)- A poisonous gas that occurs naturally and comes to the surface in “sour” gas wells. It also occurs in sewer gas. Most people can detect the characteristic “rotten egg” smell at between 10 and 100 parts per billion. At 1 to 10 parts per million, people may experience nausea, tearing of the eyes, headaches or loss of sleep following prolonged exposure. Lung irritation and damage to eyes can occur at levels of 200 ppm, an olfactory paralysis (loss of the ability to smell the gas) occurs at levels of 100ppm. Instantaneous death can occur at levels of 1,000 ppm. The Lodgepole blowout inquiry report noted that health effects can occur at levels below 1 ppm, among sensitive individuals. Little research has been conducted on the health effects of long-term, low-level, chronic exposure to H₂S although some preliminary work has indicated detrimental impacts on brain function and development. Pure H₂S is slightly heavier than air, so it does not disperse rapidly in enclosed spaces and may collect in low-lying areas such as valleys. The average H₂S content of sour gas produced in Alberta is 10 percent, although the concentration can range from trace amounts to more than 80 percent.

Invert Mud- An oil-based drilling mud, usually made with diesel fuel. An oil-based mud is used in place of water-based muds when there is a risk of encountering a subsurface rock formation that is sensitive to water.

Landman- A person who the energy company employs or hires to conduct exploration strategies, negotiate with landowners and occupants, and secure and administer oil and gas leases and other agreements. The Landman is essentially a go-between for oil and gas companies in their efforts to communicate their development plans to landowner or occupants.

Landowner- The person who is on the certificate of Title to the land issued under the Land Titles Act. This term is used generally to describe the person who owns the land.

Landspraying- This involves either spraying drilling waste onto agricultural land and cultivating to mix the waste with the soil or spraying onto vegetated land and not incorporating it. The EUB sets criteria for the maximum hydro-carbon content of the waste (which must be low), the application rate (which depends on whether or not the ground is frozen), the type of land (less than five percent slope), etc.

Mediation- This process requires the involvement of a neutral and impartial third party, the mediator. Mediators work out a process to minimize conflict and help the parties make their own, mutually acceptable decisions. A mediator may clarify issues, identify the specific concerns and needs of each party and suggest different ways the issues could be resolved. For mediation to be successful, the parties must agree to seek a common solution.

Metallurgy- The study of metals and metals processing; used to enhance mechanical, physical, and corrosion properties.

Natural Gas- A mixture of hydro-carbon and non-hydro-carbon gases, possibly in combination with liquid petroleum condensates and water.

Occupant- The person, other than the owner, who has certain rights to the land and is in actual possession of the land. The occupant may also be referred to as the tenant. The occupant may be in actual possession of the land or be shown as a person who has an interest in the land on a Certificate of Title under the *Land Titles Act*. In the case of government-owned land, such as a crown grazing lease, the occupant is the person shown in the records to have an interest in the land. The occupant on a Crown Lease may also be referred to as the lessee. In the *Surface Rights Act*, section 1(g), an occupant is a company that has been granted a right of entry to land under a right of entry order.

Oil Sands- A deposit of sand saturated with bitumen. The bitumen may be extracted by surface mining or by injecting steam through a well. The oil sands are located in north-eastern Alberta and are estimated to contain 300 billion barrels of crude oil deposits recoverable by current technology. The total estimated yield of Alberta's oil sands, is estimated at 1.7 trillion barrels of oil-more than five times the size of Saudi Arabia's oil reserves which are approximately 264 billion barrels.

Operator- Usually the company that is carrying out an activity. It includes the holder of a license, approval or permit issued by the Alberta Energy and Utilities Board. In the *Environmental Protection and Enhancement Act* it means an approval or registration holder who carries out or has carried out an activity on or

in respect to *specified land*. In the *Surface Rights Act*, it means the company that has the rights to conduct surveys or extract the oil, gas or other mineral.

Orphan Well- A well where the company holding the license to operate the well and all working interest owners are defunct or insolvent. This means that there is no owner or party that can be held responsible for the clean up. The proper abandonment and reclamation of orphan wells (and pipelines) (when it occurs) is paid for through the EUB Orphan Fund, which is financed by a levy on suspended wells.

Pipeline- A pipe used to transport a substance or combination of substances; includes installations associated with the pipe.

Pipeline Leak- A small opening, crack, or hole in the pipeline causing some product loss, but not immediately impairing the lines operation.

Pipeline Rupture- The instantaneous tearing or fracture of pipe material, immediately impairing the operation of the pipeline.

Remediation- The removal or neutralization of chemical substances from a site to reduce or prevent any adverse effects.

Right of Entry Order- An order of the surface rights board granting an operator the use of the land surface for operations such as drilling and roadway construction.

Right of Way- A legal right to pass through land owned by another. A term used for land set aside for a road, pipeline, or other infrastructure.

Royalty- A payment to the owner of a non-renewable resource for its extraction. Royalties are paid to private owners for depletion of their resources. In Alberta

the provincial government generally possesses the most of the subsurface rights in its jurisdiction thereby granting it ownership of the majority of the provinces resources.

Seismic Survey- A survey of the geological layers under the ground, conducted by sending out shock waves and measuring the way the waves are reflected back from the different layers. The shock waves may be created by dynamite charges in holes (usually 40 to 60 ft deep) or by mechanical vibrations at the surface. Geophones at the surface record the energy reflected back from different rock layers beneath the surface, which enable geophysicists and geologists to identify the geological structure and formations where oil or gas may be found.

Setback- The distance that is required to separate a project, such as a well or pipeline, from another activity, such as human settlement, water well or water course.

Sour Gas- Natural gas containing hydrogen sulphide. The Alberta Energy and Utilities Board (EUB) defines sour gas as natural gas containing more than one percent hydrogen sulphide.

Solution Gas- Natural gas that comes to the surface with the crude oil. The gas may be sweet or sour (containing hydrogen sulphide). The gas is dissolved in oil at high pressures under the ground, but released at surface pressure. If the quantities are too small to pipe economically (that is with current technologies and infrastructure the company can make a profit by sending this gas to market) , the gas may be flared.

Sub-Surface Rights- Mineral titles designate ownership of the minerals under the land and allow holders the right to explore for oil and gas.

Surface Rights- The surface title grants ownership to the land's surface and the right to work the land. Surface rights do not grant ownership to sub-surface minerals.

Sweet Gas- Gas that does not contain hydrogen sulphide. If a trace of hydrogen sulphide is present a well cannot be classified as a sweet well.

Vibroseis- A process for carrying out a seismic survey using thumpers or vibrator vehicles to create shock waves, instead of the traditional approach which detonates a charge placed in the ground.

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