

**The “nuclear renaissance”: the changing discourse of atomic energy and the
paradox of the green atom**

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Abstract:

This thesis will explore the relationship between discourse and democracy by examining the evolution of nuclear energy politics in Canada. It will document the rise and fall of a Canadian anti-nuclear movement and make a case for why this movement has not been revived to correspond to what have been the beginnings of a marked expansion of nuclear power in recent years. It will argue that the central reason for this relative lack of opposition is the current framing of nuclear power is highly compelling because it presents atomic energy as the panacea for the dual problems of energy scarcity and climate change. The broad public appeal and acceptance of this framing has created a new and dominant discourse around nuclear power.

The dominance of this discourse has reduced the space for the counter-arguments that, in the past, accompanied the claims made in favour of nuclear energy. In effect, this has worked to de-politicize a once controversial topic, and consequently, has reduced the scope for investigation into the relative merits and shortcomings of the nuclear sector. The evolution of nuclear discourse, from a complicated and multi-faceted discussion into a single dominant rationale, and the consequent limiting of debate are problematic because they hinder critical examination and active public involvement in the issue. This demonstrates the profound impact that discourse can have on the processes of public policy and the gaining of public consent.

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Introduction:

Among the energy paths that have been pursued, atomic power is distinctive in many ways. Since its inception, the splitting of the atom has played a transformative role in many aspects of human life. Features of nuclear technology are complex, and often contradictory. On one hand, the harnessing of nuclear fission to generate electricity has been embraced by many as a source of abundant energy; on the other hand, its civilian use is inextricably connected to its destructive potential to create nuclear weapons. While nuclear science has allowed invaluable advancements in sterilization and medical diagnostics, which have aided in the prevention and treatment of diseases, conversely, exposure to radiation from nuclear energy has itself been a cause of disease. While nuclear power does not emit many of the pollutants that have posed an environmental challenge in the burning of fossil fuels, it creates carcinogenic by-products that may remain hazardous for tens of thousands of years.

In public consciousness, nuclear power can represent both the best and worst elements of human technological innovation. To proponents, nuclear power is an incredible scientific achievement which should be further developed. To opponents, however, atomic energy is a dangerous and short-sighted pursuit that should be abandoned. The potential danger posed by nuclear energy has required security measures that are much more extensive than what are required for alternate energy sources. These rigid security demands have established the management of nuclear power in a centralized and institutionalized placement within the state apparatus. This centralized placement of nuclear energy has established extensive government control of the nuclear industry, which has occasionally challenged the processes of democracy. Such

challenges have occurred when nuclear developments pursued by a state have failed to align with the public will.

A struggle between state control and public consent, in this instance, emerges when the public conceptualization of nuclear power lacks congruence with the “official” perspective on the technology. In many nations, a historical clash between these dichotomous visions has daubed the progression of nuclear power with controversy. This has been the case in Canada, where the clash between two opposing conceptions of nuclear power set in motion an impassioned debate, which forced the issue of nuclear energy into public consciousness and gave rise to critical investigation of the issue. This critical examination of the nuclear sector exposed some serious problems associated with nuclear power and galvanized large numbers of the public into taking action. The collective public pressure had a significant impact on nuclear energy policies, and therefore demonstrated effective democracy.

Over time, however, one of these perspectives has been neutralized, and debate has largely ceased. Today it appears that the atomic energy sector has shaken itself free from its turbulent history. This thesis will explore the historically significant role of anti-nuclear discourse in the democratization of nuclear energy policies. It will demonstrate how an anti-nuclear narrative has been overshadowed in public discourse, and will discuss the implications of a decline of this debate.

Origins of the nuclear establishment in Canada and the corresponding build up of opposition:

Although domestic uranium mining dates back to 1932¹, Canadian research on nuclear technology began during the Second World War as a collaborative effort with the other Allied nations to develop the atomic bomb. In 1944, the United States, Britain and Canada determined that Canada was well positioned geographically to house the development of a heavy water reactor to produce plutonium for atomic weaponry. Facilities were built at Chalk River, Ontario, which was the source from where enriched uranium and plutonium were supplied to the Americans for the Manhattan Project. Following the war, the Canadian government decided that development of nuclear technology would from then on be limited to peaceful purposes². That decision notwithstanding, the nation would continue selling enriched uranium and plutonium for American weapons for another twenty years³.

Throughout the 1950s Canada expanded its mining and enrichment facilities. By the late 1950s, the uranium mining industry generated close to 100,000 jobs, and produced over one third of the global uranium supply. At its peak in 1959, uranium was Canada's most valuable mineral export, accounting for seven percent of Canadian export earnings, and contributing over 330 million dollars to the domestic economy⁴. From 1947 to 1962, uranium exports to the US alone amounted to 200,000 tons sold for 1.27 billion dollars⁵.

Over the 1950s Canada began development on nuclear energy generation, leading to the creation in the late 1950s of the heavy water generator named the CANDU reactor.

¹ The mines were built to procure radium from uranium ore. (CNA "History of Uranium Mining in Canada")

² Babin (1985) has argued that the declaration by C.D. Howe in 1949 that Canada would establish its own autonomous nuclear program and only explore peaceful uses of nuclear technology was made to avoid being pressured by the British government to house British nuclear arsenal.

³ Jackson and Tammemagi, *Unlocking the Atom*, 13

⁴ Grey, *The Great Uranium Cartel*, 53

⁵ Knelman, *Nuclear Energy: The Unforgiving Technology*, 44

The construction of Canada's first commercial nuclear reactor, at Douglas Point, Ontario, was completed in 1967⁶. Over the 1970s and 1980s, twenty-three nuclear generators were constructed, twenty of which were in Ontario⁷.

Throughout the 1960s, and then gaining momentum in the 1970s, opposition to uranium mining and the construction of nuclear power plants began to mount. Each nuclear power initiative introduced was met with vocal and organized opposition. Anti-nuclear sentiments became widespread throughout the country and united divergent groups of people who opposed nuclear power on a number of different grounds. By the 1980s, the arguments made by anti-nuclear activists had become so familiar that they politicized domestic nuclear policies. The politicization of this issue incited broader involvement by the Canadian public. This gave rise to what became a nation-wide debate, in which the anti-nuclear stance came to outweigh the arguments put forth by nuclear advocates. Between 1979 and 1983, support for nuclear power amongst Canadians dropped from forty-one percent to twenty three-percent⁸. By 1989 it had dropped down to only sixteen percent⁹. Despite attempts to counter the public distrust of nuclear technology, a series of nuclear incidents, most notably the Three Mile Island (1979) and Chernobyl (1986) disasters, in the United States and Ukraine respectively, cemented public unease.

The extensive opposition to new building proposals and frequent demands for a moratorium on nuclear energy effectively caused a stasis in nuclear expansion by the

⁶ AECL "Newsroom: Ontario Heritage Trust Commemorates Douglas Point Nuclear Station with Provincial Plaque".

⁷ Jackson and Tammemagi, *Unlocking the Atom*, 22

⁸ Mehta, *Risky Business*, 40

⁹ Harding, *Canada's Deadly Secret*, 110

early 1990s¹⁰. No new reactors were ordered after 1978, and with the completion of this last reactor's construction in 1993, construction ceased. All other nuclear project proposals were cancelled, and slumping uranium prices on the world market slowed down the mining sector. By 1997 there was a moratorium on new nuclear reactor construction in Ontario and Quebec, and in August of that year, Ontario Hydro was forced to shut down seven of its nineteen nuclear plants, after an independent American consulting team established that there were serious safety concerns due to lax standards and poor regulation¹¹. This provided additional reinforcement to the prevalent public concern regarding the safety of nuclear reactors¹². Furthermore, poor CANDU reactor sales abroad caused additional troubles for the Canadian nuclear establishment.

The economic hardships and technical challenges facing the nuclear industry presented major hurdles in expanding nuclear power; this does not diminish the central role that widespread opposition played in the decline of nuclear power. The willingness of politicians to openly advocate for the industry appeared to have largely dissolved by the middle of the 1990s, undoubtedly as a response to the vocalized demands of their constituents.

For over a decade, the future of nuclear power looked dim. However, a recent resurgence of interest and investment in nuclear developments appears to have changed this fate. Beginning with nuclear reactor refurbishments in 2003, and gaining momentum with investments and building proposals after 2005, nuclear power is once again expanding in Canada.

¹⁰ Ebner and Wallace, "Uranium exploration plans stirs health fears" A8

¹¹ Mehta, "Re-licensing of Nuclear Facilities in Canada: The 'Risk Society' in Action"

¹² Spivak and Taylor. "Canada's Nuclear Reactors: How Much Safety is Enough?"

Unlike in past decades, the current expansion of nuclear power facilities is being met with relatively little resistance from civil society. Opinion polls show that support for nuclear power has increased significantly over the last five years and is continuing to rise. The support for nuclear energy is increasing in every demographic group, and is especially strong in Ontario where it has risen from 48 percent to 63 percent between 2005 and 2007¹³. Many formerly vocal anti-nuclear groups have changed their stance in recent years. For example, in the fall of 2007, Canada's main Inuit organization, Nunavut Tunngavik Inc, dropped their moratorium on uranium mining which had been in place since 1989¹⁴. Despite regional differences, and British Columbia's continued moratorium on uranium exploration, nuclear fervour is spreading across the country. Uranium exploration is occurring in Labrador. Nova Scotia's nuclear power moratorium has not been renewed. In New Brunswick, already home to one nuclear reactor, a private-public partnership between the crown corporation, Atomic Energy of Canada Limited (AECL), and a number of private companies are currently constructing a new five billion dollar power plant. Quebec is operating a 675-megawatt reactor. Ontario derives close to half of its power from its sixteen nuclear power plants¹⁵. The province is currently expanding its uranium mining projects, and is also planning to expand its number of nuclear plants. In June, 2008, Energy Minister Gerry Phillips announced plans to build two new reactors in Darlington as part of a 26.3 billion dollar provincial nuclear

¹³ Geddes, "Harper embraces the nuclear future"

¹⁴ Ebner and Wallace, "Uranium exploration plans stirs health fears" A8

¹⁵ Fuji-Johnson, *Deliberative Democracy*, 4

power expansion plan¹⁶. Alberta is also looking into the feasibility of a reactor to fuel its tar sands project¹⁷.

Saskatchewan is one of the globe's uranium mining hubs, and is considering a Bruce Power proposal for a reactor. A recent poll of over 800 people carried out by Bruce Power revealed a surge of support for nuclear power in the province. General support for nuclear power was measured at fifty-five percent, which makes Saskatchewan the second most nuclear-friendly province, after Ontario¹⁸. The province has also been rapidly expanding its uranium mining. Between 2003 and 2007, spending on uranium exploration in Saskatchewan increased ten times, exceeding 130 million dollars in 2007¹⁹.

On November 9, 2007, the Harper government announced that Canada would be joining the U.S. led Global Nuclear Energy Partnership (GNEP). The GNEP, initially proposed in 2006 by then President, George W. Bush, is an international association of nations dedicated to the promotion of nuclear energy, both domestically and abroad²⁰. The signing on to the partnership signified a very firm commitment on the part of the Canadian government to ensuring a continued progression of nuclear development.

A rising acceptance of nuclear power can be observed in a number of other countries. In September of 2007, *The Economist* reported that opinion polls in Britain revealed that opposition to nuclear power declined by thirty percent over the previous five years; in the US, support for the expansion of the nuclear industry has increased from

¹⁶ Benzie and Ferguson, "Ontario aiming to lead 'nuclear renaissance'"

¹⁷ Mehler and Paperny, "Nuclear activity in other provinces"

¹⁸ "Positive thinking in Italy, Canada and Poland". World Nuclear News

¹⁹ Elston, Murray. "The Greening of Nuclear"

²⁰ Cheadle, Bruce. "Canada to join controversial nuclear partnership"

forty-four percent in 2001 to fifty percent in 2007²¹. In August 2005, the U.S. government granted a twenty billion dollar subsidy package to the nuclear power sector²². As of May 2006, there were twenty-seven new nuclear power plants being constructed globally^{23 24}.

The surging support for nuclear power and declining opposition raises the question: what happened to the anti-nuclear movement? While anti-nuclear organizations still exist, their numbers and activities have decreased significantly. The re-emergence of nuclear power as a prominent domestic energy source has not re-sparked the activism of the past.

This thesis will make the case that today's relative lack of opposition to nuclear energy is a result of a rise to dominance of a new discourse; the dominant discourse has reduced the space for the counter-arguments that might otherwise re-build an opposition movement. This rise to dominance has occurred because the discourse has been framed in a way that is highly compelling to the public. The high degree of resonance of this framing relates to its compatibility with two central issues of public concern that have emerged in recent years. These two issues are the availability and affordability of energy, and environmental issues, particularly relating to climate change.

The nuclear industry and its proponents are presenting nuclear power as a panacea for these dual problems of energy insecurity and climate change. This framing has had the effect of winning over support from environmentally concerned citizens. This

²¹ "Nuclear power's new age", *The Economist*, 11

²² McLeish, *The Pros and Cons of Nuclear Power*, 43

²³ Many of the new commercial reactors are being built in developing countries, such as China, India, Indonesia and Vietnam, which demonstrates expanding markets for nuclear reactors

²⁴ McLeish, *The Pros and Cons of Nuclear Power*, 43

presents a paradox: many former opponents to nuclear power opposed the technology on environmental grounds, yet it is the supposed environmentally benign character of nuclear power that has gained the support of the growing number of nuclear power advocates. To demonstrate this thesis, this study will analyze the evolution of Canadian nuclear discourse through the theoretical lenses of “discourse coalitions”, “framing”, “discursive democracy”, and “the public sphere” to demonstrate how the current “nuclear renaissance” has been semantically constructed and why it has been so effective at co-opting public consent.

The first chapter of this thesis will outline these theoretical concepts. Chapter two will document the central reasons for past opposition to nuclear power and will demonstrate the politically significant role that this opposition played. The public debate and involvement that this issue incited will be documented and the case will be made that the anti-nuclear movement represented a testing by members of the Canadian public of their democratic institutions. The ability of this movement to impact nuclear energy policy was therefore an example of successful democratic action. Chapter three will analyze the discursive shift in nuclear energy discourse by presenting the current dominant framing of the technology. This will show that nuclear discourse has been simplified and de-politicized, and that this evolution has narrowed the scope for debate, and thus, democratic participation. Chapter four will discuss problematic dimensions of current nuclear energy policies to prove that the past opposition to nuclear power is still highly relevant today and that the lack of debate is problematic. This study will conclude by addressing the environmental aspects of nuclear energy discourse more directly, in

order to establish that the current framing of nuclear power as an energy panacea is contestable, and that realistic alternatives to nuclear energy are available.

Chapter 1: Theory

This chapter will introduce the theoretical concepts used for this thesis. The term “discourse” has numerous definitions. It is commonly used to connote specialized knowledge claims, formal discussion, the organization of ideas, or simple conversation. Discourse studies have been undertaken in a number of social science disciplines, which have adopted and expanded the various definitions of the word. Many applications of discourse theory in the social sciences are, in part, informed by the work of Michel Foucault’s notion of discourse as institutionalized thinking²⁵. The use of the term “discourse”, and the terminology which follows from it in this study will be based on Maarten Hajer’s definition of discourse, as the ‘discursive production of reality’. The broader theory used for the purposes of this thesis will be based on the work of Maarten Hajer, Robert Cox, and John Dryzek. To help establish the relationship between discourse and democratic participation in relation to nuclear energy, this study will make use of Jürgen Habermas’ notion of the “public sphere”. Lastly, this chapter will explain the methodology used for the discourse analysis that will be presented in chapter three.

The importance of discourse is paramount for the public’s conceptualization of technology and the political decision-making process. Discourse often involves symbolic and metaphorical concepts and, for the purposes of this thesis, encompasses any semantic production that generates a shared understanding, of “reality”. Adopting the terminology of Maarten Hajer’s discourse theory, this shared understanding of reality is collectively established in public consciousness through an organizing system of “narratives”, which

²⁵ Foucault, *The Archaeology of Knowledge*, 49

are each composed of supporting “story lines”. “Story lines” are the component lines of reasoning that collectively support an understanding of the truth. Discourse around an issue is thus a common conceptual comprehension consisting of narratives, and the story lines that collectively establish and reinforce the “reality” of the narratives.

Maarten Hajer conceptualizes the creation of reality through a process in which “discourse coalitions” form what he calls the “mobilization of bias”. Discourse coalitions are comprised of all the actors that organize around a shared narrative, who collectively give rise to the social practices that emerge from such narratives. The formation of these coalitions and their mobilization around the framing of issues is a central element of the political process in democracies. The various actors that make up the coalition may have conflicting interests, or may operate completely separately from one another, yet their shared understanding of a particular construction of reality binds them into a coalition of sorts²⁶. He summarizes this perspective by stating that “A discourse coalition is thus the ensemble of a set of story lines, the actors that utter these story lines, and the practices that conform to these story lines, all organized around a discourse”²⁷.

Discourse around an issue is not always limited to a singular narrative, but rather, is often composed of competing narratives. This is the case for any politicized topic, for instance, the issue of abortion. Abortion discourse is generally polarized into two main narratives. One narrative is comprised of story lines that support the view that abortions are a legitimate option in at least some circumstances, which must be legally sanctioned in order to protect women’s rights. Story lines in the other main abortion narrative support the perspective that an abortion is an unnecessary act which undermines the

²⁶ Hajer, “Discourse Coalitions and the Institutionalization of Practice”, 45

²⁷ Hajer, “Discourse Coalitions and the Institutionalization of Practice”, 47

inherent sanctity of life and represents a moral violation. Because many of the story lines within these two narratives are incompatible, they cannot simultaneously reinforce reality; individuals adopt the one which is the most consistent with what they believe to be true. Despite applying one of these two narratives in their personal comprehension of the issue, the topic is well understood to be a contentious one. Each narrative must be defended based on the logic of its composite story lines against the logic of competing story lines. In this example, there is a pro-life narrative, and there is pro-choice narrative, but the public discourse of abortion is understood to encompass both of these narratives, which are supported and advanced by their respective discourse coalitions.

An important element of Hajer's articulation of discourse is that the growth of a discourse coalition can give rise to the dominance of a narrative. When a narrative comes to dominate discourse, it is no longer one of many competing viewpoints, but rather, becomes simply "reality". Two factors determine whether the discourse coalition becomes dominant. The first is when the rhetorical power of the discourse persuades central actors and the second is when the discourse is institutionalized in practice²⁸. The dominance of a discourse coalition gives meaning to social situations which are otherwise ambiguous. When the issue at hand is a political one, the transformation of the issue into a dominant narrative becomes central to the political process²⁹.

There are many examples of discourses that are not forced to contend with competing versions of "the story", as it were. Examples of a dominant discourse in Canadian society include the immorality of torture, the legitimacy of the police and military to exercise the monopoly on violence within the state, and the acceptability for

²⁸ Hajer, "Discourse Coalitions and the Institutionalization of Practice" , 66

²⁹ Hajer, "Discourse Coalitions and the Institutionalization of Practice" , 45

provinces and territories to practice some degree of jurisdictional autonomy. In these instances, there are invariably individuals or groups who challenge a dominant discourse, however, when a discourse coalition is in a dominant position, these challenges are not serious ones.

“History” provides a collection of examples in which dominant understandings of events go unchallenged. Rather than being viewed as “a version” of the story, or “part of” the story, the telling of an historical account simply is conceptualized as “the story”. The story lines understood to comprise modern human history are supported by a dominant discourse coalition throughout the industrialized, English-speaking world and beyond. The narratives put forward by this coalition follow the story lines of history as they were articulated by central actors close to channels of power and influence. Historically colonized and subjugated groups, as well as “rogue” historians have endeavoured to challenge historical “facts”, or to document the historical experiences of people and events “written out” of history. Although “knowledge” about history is constantly evolving based on new findings, radically different conceptions of historical events that are held by some individuals and groups have not interjected themselves into the dominant discourses of modern history to the extent that they have been transformative³⁰.

Hajer’s conception of discourse coalitions can also be supplemented with the work of the prominent environmental communication scholar, Robert Cox. Cox delineates two central ways in which public understanding of environmental issues can be influenced by narratives in the media. These are the modes of framing and the level of

³⁰ The “correction” of history has not been limited to earnest attempts to bring recognition to the experiences of women, indigenous and persecuted groups; it also includes efforts to erase or undermine historical events for political or ideological purposes, a notorious example being Holocaust denial.

repetition. “Framing” is simplifying a message from a complex web of information, which generally involves numerous contradictory components and countless nuances, into a coherent and manageable reconstruction³¹. The combination of a compelling framing of an issue and its repetition creates an established “truth” in public consciousness³². A narrative that has conflicting discursive elements, or story lines, is less likely to be accepted by the public as an established truth, whereas one that has compatible components will often come to dominate the discursive construction of an issue³³.

Framing has been an important concept in the broader discipline of social movement theory. By borrowing this concept from the social movement theory stream, Cox’s definition of framing can be extended further. Social movement theory conceives of framing as a method to build up sympathies and alliances based on common understandings. These common understandings are forged and invoked through appealing to shared cultural reference points, which when successful, resonate with people³⁴. The example of abortion discourse can be used again to illustrate these points. In this instance, both discourse coalitions employ similar concepts to gain sympathy; both coalitions invoke the concept of human rights, and the notion of responsibility in the framing of their narratives. Pro-life activists have framed their arguments in moral terms, based on the story line that a foetus is a human being, and that therefore having an abortion is equivalent to murder. It is therefore the responsibility of pregnant women, their families and/or society at large to protect the inherent right to life of the unborn

³¹ Cox, *Environmental Communication and the Public Sphere*, 177

³² Cox, *Environmental Communication and the Public Sphere*, 189

³³ Peeples et al, “Arguments For What No One Wants”, 43

³⁴ Noakes, “Official Frames in Social Movement Theory “, 89-90

baby. This moral framing has forged alliances and sympathy between various religious organizations and conservative factions, who have been the backbone of the pro-life discourse coalition.

Conversely, the pro-choice discourse coalition has united divergent actors who have adopted the shared narrative that the ability of women and their families to access abortions is a necessary and equity-enhancing human right, and that giving birth to a baby that may not be properly cared for is irresponsible. The pro-choice coalition frames their narrative with story lines about the rights of women to exercise autonomy in their lives, and has been largely driven by women's rights advocates. Both of these coalitions are then fortified by members of the public who find their respective story lines the more compelling. Although staunch proponents of either narrative may unequivocally support and accept their narrative as the correct one, the clash of competing abortion story lines in the broader public discourse on abortion forces both coalitions to question and defend their views. Conversely, when there is congruence between the story lines, as in the case of a dominant discourse, a "truth" is established which goes unquestioned. The dominance of a discourse can prove problematic for democracy; in such an instance there may be a barrier to democratic participation because it narrows the scope of debate.

The association between discourse and democratic participation is explored in Jürgen Habermas' notion of the "public sphere". A juxtaposition of Hajer's "discourse coalitions" and Habermas' "public sphere" theories provide two different lenses by which to examine the relationship between discourse and democracy. Hajer and Habermas differ in their views regarding reality and the role of manipulation in discourse. Hajer believes that propaganda and reality are inseparable; reality results from the tension

created by conflicting discursive messages, because it forces recognition of the complex and contradictory dimensions of any given issue. Habermas, on the other hand, believes that a state of reality exists separate from propaganda. Through the process of critical discussion and reflection, propaganda can be exposed and reality discerned by a reasoning public. In spite of these differences, Habermas and Hajer's theories produce similar conclusions regarding the significant role that debate plays in the thriving of democracy. The absence of debate, in both instances, can obscure elements of the truth by permitting manipulation by dominant forces to go unchallenged. Because these theories have this central theme in common, they are highly compatible for the purposes of this study.

In *The Structural Transformation of the Public Sphere*, Habermas conceives of the "public sphere" as a space where public debate occurs and gives rise to a critical public consciousness. The creation of this open and participatory forum fosters increased public rationality through discussion and reflection. The encouragement of critical public thought effectively acts to democratise the state because it permits a society to determine and articulate its interests in a forum that is separate from both the government and market forces. A public consensus is forged through lively discussion and debate; this consensus on political issues allows citizens to collectively define their will and exert influence on political decisions, thus legitimizing government control by injecting active consent through participation in the political system³⁵. Habermas argues that the erosion of the public sphere occurs when the public and private realms merge together, for instance, when private interests become so dominant in public space that they supplant

³⁵ Habermas, *The Structural Transformation of the Public Sphere*, 27

public interests³⁶. Habermas partially attributes the erosion of the public sphere to the heavy presence of political manipulation and consumer advertising that accompanied the rise of mass communication; the supplanting of traditional news and the publication of information with a market-driven mass media has effectively manipulated the public into a state of uncritical idleness. The “selling” of uninformed and uncritical “ready-made” opinions by a privately controlled media to the public has reduced the space for public criticism to occur free from the influence of the market and state³⁷.

The notion of the public sphere as a place in which citizens can collectively debate the needs of society illustrates the crucial role that open and critical dialogue has in facilitating meaningful democratic participation. In this view, a major indicator of a thriving democracy is not the nature of the opinions held by a society, nor the outcomes of society’s consensuses. Rather, the feature that is central to meaningful democratic participation is the extent to which people are engaged and informed about the issues that affect their lives.

Habermas’ notion of the requirements of meaningful democracy is supported by John Dryzek. Both Dryzek’s and Habermas’ conceptions of meaningful democracy place faith in the rational capacity of members of the public to collectively determine and articulate their needs; furthermore, both require an autonomous space for debate to occur. When this space is forged through social organization and collective pressure, it enhances the competence of individuals to partake in coordinated problem solving, through a process that Dryzek calls “communicative rationality”. When communicative rationality occurs in an openly participatory environment, it effectively overcomes the vestiges of

³⁶ Habermas, *The Structural Transformation of the Public Sphere*, 217

³⁷ Habermas, *The Structural Transformation of the Public Sphere*, 246

control by dominant interest groups, as well as individual pursuits of narrow self-interest³⁸. Even when consensus of what is the common interest cannot be reached through communicative rationality, free, public and reflective dialogue provides a “mutual recognition of legitimate, if different, interests”. Such recognition allows for the complexity of social issues to be acknowledged and attempts to address these issues based on nuanced understandings rather than simplification. Because of this, communicative rationality necessarily leads to more democratic policies³⁹. In practice, an acknowledgment of complexity could lead to an emphasis on the unique experiences of minorities or marginalized groups, and the legitimization of these experiences in the construction of “reality”.

Dryzek argues that modern democracies can be characterized by extensive bureaucratization of government in conjunction with the privileging of technological expertise; this has created societies that are ill-equipped to deal with their complex social problems⁴⁰. He builds on the theories of Habermas, arguing that the influential role of the market and state on public rationality has given rise to unthinking compliance, and a stifling of potential resistance by the monopolization of “expert culture” in science, technology, law, art, and other fields⁴¹. Although expertise is an essential aspect to resolving complex problems, it becomes problematic when it precludes the ability of “non-experts” to develop views that challenge esoterically formulated assertions.

Dryzek argues that critical public thought and active resistance can be regained through public discourse, reflection and active involvement, thus bringing about

³⁸ Dryzek, *Discursive Democracy*, 71

³⁹ Dryzek, *Discursive Democracy*, 71

⁴⁰ Dryzek, *Discursive Democracy*, 5

⁴¹ Dryzek, *Discursive Democracy*, 12

“discursive democracy”, through which the needs of society can be addressed.

Discursive democracy, according to Dryzek, can be seen as inimical to liberal democracy, which is based on “voting, strategy, private interests, bargaining, exchange, spectacle, and limited involvement”⁴². By contrast, discursive democracy is defined by its emphasis on communication, education, active involvement and a focus on the public interest⁴³. This form of democratic action has been displayed in various forms of social organizing, including radical religious activism, as demonstrated by the Quaker and Unitarian churches, as well as environmental, feminist, anti-nuclear, civil rights and peace movements, which he argues, can be viewed as attempts to re-create identities, and as “engaging in a communicative assertion of the claims of a threatened lifeworld against encroachments by the state and capitalism”⁴⁴. He argues that such social movements should therefore not be confused with dissimilar conservative backlashes to modernity, as seen in organizations of the religious right or neo-fascist movements⁴⁵.

The demonstration of discursive democracy, as seen in many instances of social organizing, is fundamentally a contestation of dominant values systems and an attempt by members of the public to assert a vision of social progress that is at odds with the aims of the state and market forces. This is well demonstrated within the environmental movement more broadly, which discursively constructs the need to preserve the natural environment from Faustian-like policies to pursue industrial growth at any cost. Environmental story lines sometimes frame the contested issue in question, (for instance, the clear-cutting of rain forests, the development of the Alberta tar sands, the introduction

⁴² Dryzek, *Discursive Democracy*, 13

⁴³ Dryzek, *Discursive Democracy*, 13

⁴⁴ Dryzek, *Discursive Democracy*, 49

⁴⁵ Dryzek, *Discursive Democracy*, 49

of “terminator” seeds into modern farming practices, etc.,) not as an ill-conceived or short-sighted pursuit, but rather as an incarnation of humanity’s flaws. This rationale exists in an anti-nuclear story line, which maintains that nuclear technology in its many forms represents the capacity for humans to violently destroy themselves and the environment in an attempt to “play God” by exerting power over the physical environment. The imagery within these story lines is laden with symbolism relating to a “natural” versus “man-made” environment, and in this regard is similar to many other methods of framing that have characterized anti-technology narratives. Other kinds of story lines that make up environmental narratives are often framed as philosophical or else rhetorical questions regarding the sacred or spiritual, entitlements to land, the rights of people and/or animals to a particular quality of life, egalitarianism, a responsibility for society to ensure preservation of nature and a consideration of the impact that current actions will have on the future.

Reclamation of a “threatened lifeworld against encroachments of the state and capital” are also displayed in other story lines of the anti-nuclear narrative, and are common discursive threads in many other social constructions of issues that involve a loss of public autonomy, and a lack of control by a society to collectively define their interests. These story lines often take the form of clashes over science-based narratives concerning the necessity or acceptability of adopting risk. These story lines focus on a need for the democratization of policy-making on issues that potentially pose a risk to the public. The underlying demands that these story lines make is that any unnecessary risks to a society, no matter how small these risks may be, should be adopted on a voluntary basis, rather than being politically imposed. Therefore the forcing of risk on society by

the state, particularly when it lacks social consensus, represents a failure of democratic deliberation. When social stakes are secondary considerations to economic or technological advancement, the pursuit of a trajectory of progress can be observed that is antithetical to the public interest. The focus on risk, in environmental and other narratives, can thus be seen as an attempt to force a legitimization of public will in a space dominated by private interests.

The concept that a privileging of technological expertise has occurred through the rise of “expert” culture sheds light on how societal power hierarchies can influence discourse, and consequently, democratic decision-making. Both Habermas and Dryzek discuss the influence that both state and market forces exert through concerted efforts to control the nature of the information that is disseminated, as well as through the legitimization of particular claims to knowledge. This process has helped to establish conventional thinking, or what Hajer refers to as “official” narratives. The production and persistence of “official narratives” has allowed decision-making authorities to opportunistically advance their own interests. The rise of “expert” culture and the hegemony of “official” narratives can paralyze democracy if they prohibit the legitimization of public views that contradict “expert” knowledge. However, the supremacy of “expert” opinion in society can be challenged when a competing narrative is backed by a strong discourse coalition. A powerful discourse coalition can overcome the subjugation of public values by “expert” opinion through a forging out of space in which its narrative is forced to be heard. In the discourse that follows from this building of this public sphere, each narrative can be evaluated in relation to its competition, and this tension can lead to a compromise. An illustration of how a compromise between

“official” and competing narratives can be forced by a discourse coalition is demonstrated by the issue of hormonal growth drugs used in beef cattle.

Hormonal growth promoters can be used to increase lean tissue mass in cows, which can lower the required amount of livestock feed, produce higher quantities of beef, and consequently lower the costs of beef production. Various scientific studies to assess the potential risks of this practice to human health have been carried out. Scientific studies have not demonstrated a relationship between adverse human health and the consumption of hormone-treated beef⁴⁶. Because no relationship between adverse human health and hormonal growth promotion in cattle has been established, its use is approved in both Canada and the United States. Despite being informed by the same scientific findings, the use of hormonal growth promoters has been banned in the European Union. Health Canada has justified the Canadian government’s approval of hormone-treated beef in the following public statement:

“It is imperative that any decisions taken by the Government of Canada regarding the use of hormonal growth promoters be based on the most accurate interpretation of scientific evidence available. To this end, Health Canada's Veterinary Drugs Directorate (VDD) undertook an intensive review of seventeen studies commissioned by the EU to assess scientific information on the toxicity and safety of hormone-treated beef. VDD's scientific review of the EU studies concluded that residues in meat from animals treated with hormonal growth promoters (when administered according to good veterinary practices) pose no undue risk to human health. This conclusion is consistent with that reached by the US Food and Drug Administration.”⁴⁷

By comparison, and despite causing disputes in the World Trade Organization⁴⁸, the European Union has banned their use because of broad public concern/ consumer pressure and because of the scientific *uncertainty* of the safety of hormonal growth drugs.

⁴⁶ Health Canada. “Questions and Answers-Hormonal Growth Promoters”

⁴⁷ Health Canada. “Questions and Answers-Hormonal Growth Promoters”

⁴⁸ “US demands sanctions in EU beef row”. *BBC News*

In this example, the public opinion that hormone-treated beef is unsafe is legitimized even though it is not supported by scientific evidence, and therefore demonstrates how the privileging of scientific expertise can be challenged by sufficient public pressure. Although economic concerns regarding consumer boycotts undoubtedly played a large role in the decision to ban imports of hormone-treated beef from North America, this approach, which evaluates safety by incorporating public will, is also demonstrated through the legal obligation for extensive labelling of genetically modified products in the European Union⁴⁹. These cases emphasize the rights of consumers to exert influence based on their own views of safety, as opposed to a government singlehandedly determining what is safe based on scientific findings, and making information that could lead to consumer-based decisions unavailable. These two approaches demonstrate how values can be prioritized differently when evaluating scientific findings, technological advancements, economic incentives and the public will in the legal application of accepting potential risks.

Lastly, this thesis involves a critical discourse analysis of the current rhetorical construction of nuclear power to determine the level of dominance of the pro-nuclear narrative, and to evaluate the impact of this discourse on public debate. The methodology for this required an analysis of a wide range of textual documents. The intention of examining a broad group of documents was two-fold. Firstly, “official” sources were examined to see how the industry is presenting itself and advancing a pro-nuclear narrative. Secondly, the intention was to analyze a divergent source of

⁴⁹ “Questions and Answers on the Regulation of GMOs in the European Union”. *Europa*

documents in order to assess how widely the story lines of this narrative on nuclear power have been adopted and advanced by various groups outside of the industry. The methodology involved examining pro-nuclear discourse to determine recurring themes that make up a cohesive narrative, and to assess if or when these pro-nuclear story lines are confronted with a contradictory narrative. Specific attention was paid to the following themes: nuclear power in relation to broader environmental discourse; the portrayal of scientific expertise versus public opinion; the issue of nuclear waste; the depiction of opponents to nuclear technology.

The sources used included national newspapers, magazines, books, journal articles, the websites of governments (provincial and federal), crown corporations, regulatory bodies (such as the Canadian Nuclear Safety Commission, the Nuclear Waste Management Organization, Health Canada and Environment Canada), private nuclear sector companies, consulting firms, environmental groups and civil society organizations (for instance, Women in Nuclear and the Canadian Nuclear Society). This thesis attempts to focus on Canadian nuclear discourse, however, some sources, such as Women in Nuclear and the Nuclear Energy Institute, are international. Furthermore, a number of non-Canadian sources were used either because of their applicability to the Canadian context or because of the influence that the specific publications or viewpoints have on Canadian discourse. These include a number of books and journal articles as well as news publications such as *The New York Times*, *The Guardian*, *The Economist* and *The Washington Post*. A cursory overview of public pro-nuclear discourse from a number of countries outside of Canada suggests that this study has wider applicability than the

regional confines of this study. However, this research is attempting to provide an overall picture of the ways in which the new nuclear discourse is evolving in Canada.

Together, the theories and methodology presented in this chapter provide a framework by which to understand today's nuclear discourse. Historically, the tension created by contradictory story lines gave rise to a lively and impassioned debate, thus creating a thriving public sphere in which information was sought, examined and challenged. The forging of this public sphere drew in broader public participation, and incited civic involvement that successfully influenced public policy. This process was therefore a demonstration in the functioning of Canadian political institutions through discursive democracy. These theories will not only contextualize historically polarized nuclear energy discourse in Canada, but will suggest the possible implications of the current discursive evolution from two competing nuclear narratives into one dominant narrative.

Chapter 2: The anti-nuclear discourse coalition

The following chapter will provide an examination of the main components of the anti-nuclear narrative. It will document the rise of the anti-nuclear movement and will show the broad base from which the discourse coalition drew its support. This chapter will demonstrate that the arguments put forth by nuclear critics occupied a significant space in public discourse for a time, and managed to create public controversy by interjecting a competing narrative into the one being advanced by the nuclear establishment. The clash of competing story lines in nuclear power discourse challenged the claims to ‘truth’ of both narratives, and as a result, revealed complex and contradictory dimensions of nuclear power. In effect, this conflict gave rise to a lively public sphere in which Canadians were encouraged to become informed and analytical participants in a debate about nuclear power. The thriving of this public sphere resulted in the extensive reflection, investigation and civic activism that are characteristic of discursive democracy. The collective public pressure had the significant political impact of blocking the expansion of nuclear power, and was therefore a demonstration of discursive democracy in action. Although this was an example of the effective exercise of public will, it also highlights how the delivery of discursive democracy is often a process with continuous hurdles. Despite the many successes of the anti-nuclear movement, the Canadian nuclear industry was never dismantled; even though nuclear critics fought the industry to a standstill, they were never fully able to contend with the power that remained in the hands of the nuclear lobby. This highlights the level of entrenchment of the nuclear sector within the Canadian political system, and speaks to the continued need for on-going public debate and action. A revival of a thriving public

sphere and on-going citizen involvement is required to maintain democratization of nuclear policy-making.

A Canadian anti-nuclear narrative emerged in the 1950s from the international peace movement occurring at that time. This narrative was largely spearheaded by scientists concerned about the dangers posed by atomic weapons and also by a number of religious organizations, which were central in trying to spread public consciousness of the potential harms and ethical implications of nuclear weapons. Throughout the 1960s and 1970s, an anti-nuclear discourse coalition began to grow by intersecting with other social movements, particularly the women's movement and the expanding number of groups concerned with ecological conservation.

In 1974, India exploded an atomic bomb made from the plutonium from a CANDU reactor donated by Canada, and funded by Canadian taxpayers. This event was significant in building-up the anti-nuclear discourse coalition because it introduced a new and powerful dimension to the anti-nuclear narrative. This dimension was the establishment of a relationship between the "peaceful" use of nuclear technology and nuclear proliferation. This story line buttressed the coalition by re-orienting many members of the Canadian public's views about the connection between different forms of nuclear technology and their own nation's culpability in the development of nuclear arms. That year, members of the public began to collectively protest international sales of CANDU reactors. Opposition to international CANDU sales were led by the Ontario based organization, CANTDU⁵⁰. The story line advanced by these groups supported the belief that the federal government was aggressively marketing CANDU reactors abroad in order to create new markets for uranium sales, while presenting the public

⁵⁰ Mehta, "Regulating Nuclear Power", 112

subsidization of international CANDU sales to Canadians as an obligation to “assist the developing world”⁵¹. According to the logic of this story line, the heavily subsidized sale of CANDU reactors to countries such as India, Argentina, Pakistan and Romania was therefore being done, at the expense of Canadian taxpayers, in order to economically benefit powerful lobbyists within the Canadian nuclear sector. Furthermore, a politically motivated act aimed at satisfying the demands of the nuclear lobby might lead to nuclear weapons proliferation, because even if the recipient countries of CANDU reactors do not use the generators to develop weapons, nothing will stop them from selling plutonium to other nations who may⁵².

In 1975, a group of opponents to atomic developments formed the Canadian Coalition for Nuclear Responsibility (CCNR). The CCNR became an early leader of the anti-nuclear discourse coalition by making vocal demands for public inquiries into the nuclear industry⁵³. The CCNR expanded on the story lines of CANDU and other members of the anti-nuclear discourse coalition who argued that there was a serious conflict of interest within the regulatory body of the nuclear industry because the people responsible for regulating the nuclear sector were simultaneously the industry’s beneficiaries. The story line that there were inherent weaknesses in nuclear regulation became a lynchpin in the anti-nuclear narrative; this central story line was invoked to build up many additional story lines regarding the supposed safety hazards of nuclear energy.

⁵¹ Bratt, *The Politics of CANDU Exports*, 16

⁵² Bratt, *The Politics of CANDU Exports*, 17

⁵³ Babin, *The Nuclear Power Game*, 154

By the late 1970s, the prevalence of outspoken doctors, scientists and academics⁵⁴, within the anti-nuclear discourse coalition, had the effect of raising broader public concern and convincing many members of the public about the legitimacy of their narrative. Prior to this period, nuclear energy had not received significant public attention. In fact, a 1976 national survey had concluded that forty-four percent of Canadians were not even aware that nuclear power was used in their nation's electricity generation⁵⁵. As nuclear power increasingly became politicized throughout the late 1970s, public awareness of nuclear power grew, as did opposition to it. Throughout the country, citizens' groups joined with scientists and religious communities in opposing nuclear technology. Canadian activists also took cues from the anti-nuclear movement which had developed in the United States in this time period. Groups such as the Ford Foundation and the Union of Concerned Scientists provided Canadian protesters with numerous reports and studies that further supported the story lines that radioactive material was harmful to human health⁵⁶. In 1983, the Atomic Energy Control Board attempted to raise the level of radioactive exposure permissible for employees in the nuclear sector. This sparked a massive campaign that united several thousand atomic sector workers with organized labour groups such as the Public Service Alliance, Canadian Union of Public Employees and the Nurses' Union. The strong opposition forced the AECB to retract their proposal⁵⁷. The 1984 formation of the International

⁵⁴ Such as Dr. Bruce Doern, Dr. Gordon Edwards and Dr. Fred Knelman, to name a few. Many Canadian physicians were members of the international group Physicians for Social Responsibility; from this group, the Canadian branch of Physicians for Global Survival formed in 1980.

⁵⁵ Greer-Wootten and Mitson. "Nuclear Power and the Canadian Public"

⁵⁶ For archives of these reports, see: <http://www.fordfound.org/archives/item/1980/text/23> and <http://www.ucsusa.org/ssi/archive/>

⁵⁷ Mehta, *Risky Business*, 40

Institute of Concern for Public Health later led to further publications that supported these story lines⁵⁸.

The belief that exposure to radiation causes abnormally high rates of cancers and chromosomal mutation that can lead to birth defects became widely adopted. In fact, this story line became so prominent that it forced a legal admission by Ontario courts about the established link between exposure levels in uranium mines and some forms of cancers. The Ontario Workplace Safety and Insurance Board, quoting the 1997 Workplace Safety and Insurance Act, states:

“Primary cancers of the trachea, bronchus and lung among workers previously employed in uranium mining in Ontario are recognized as occupational diseases under the *Workplace Safety and Insurance Act*. They are both characteristic of uranium mining and result from exposure to ionizing radiation relating to the uranium mining industry”⁵⁹.

This legal admission has established a legal claim against the crown for uranium miners seeking financial redress after developing lung cancer⁶⁰.

Concerns about the health risks of radiation exposure fuelled extensive opposition by communities to localized nuclear proposals. The mobilization of communities around this aspect of the narrative gave rise to numerous regional anti-nuclear organizations, for instance, the Concerned Citizens of Manitoba, the Maritime Energy Coalition, and Durham Nuclear Awareness, to name a few. The wide adoption of the health hazard story line, and the consequent formation of localized opposition across the country added substantial bulk to the anti-nuclear discourse coalition. This fragment of nuclear discourse was often framed with highly compelling “not in my backyard” sentiments, and

⁵⁸ To access these publications, see <http://www.iicph.org/srch.shtml>

⁵⁹ Ontario Workplace Safety and Insurance Board. “Occupational diseases: policy”

⁶⁰ Workplace Safety and Insurance Tribunal. “Decision no. 400/08”

was successful at uniting divergent groups of people. For example, in 1980, strong opposition to a uranium refinery construction proposal in Warman, Saskatchewan forced the project to be abandoned. The opposition was spearheaded by Warman's Mennonite community but incited participation from a large and divergent pool of people who organized public hearings. The public hearings involved statements from prominent community leaders, as well as farmers, teachers, students, Aboriginal people, academics, scientists and physicians⁶¹.

During the first few decades of Canada's nuclear era, the issue of nuclear waste was not part of the discourse. However, by the late 1970s, the Canadian government acknowledged that the storage of spent fuel was an issue of pressing concern that necessitated a plan for long-term management. This introduced "nuclear waste" story lines into public consciousness and it became a very important dimension to both narratives. A heightening of public unease over accumulating radioactive waste was an asset to the persuasiveness of the anti-nuclear narrative. To win back members of the public to the pro-nuclear narrative, the nuclear industry began presenting prospective solutions to demonstrate that science could render nuclear waste innocuous. Early suggestions for waste disposal methods included launching the radioactive material into space, and burying it in the ocean floor⁶². By the end of the 1970s, the nuclear industry began to develop the concept of deep geological disposal of nuclear waste in the Canadian Shield⁶³. In 1977, the federal government published "The Management of Canada's Nuclear Wastes", produced by a committee and chaired by Kenneth Hare. This

⁶¹ Report on the Environmental Assessment. *Why People Say No: Uranium Refinery At Warman, Saskatchewan*

⁶² Fuji Johnson, *Deliberative Democracy*, 25

⁶³ Canadian Environmental Assessment Agency. "Report of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel".

report, known as the Hare Report, advocated the disposal of nuclear waste in the Canadian Shield, supporting the rationale that concerns about disposal need not slow the progression of nuclear energy developments. Rather than winning over the public to this view, the report gave the anti-nuclear discourse coalition additional leverage by prompting criticism from divergent groups including The Canadian Medical Association, the British Columbia Medical Association, the President of Ontario Hydro and even one of the creators of the CANDU reactor, Bennett Lewis⁶⁴. In that same year, the AECL began tests on rock bodies to determine whether their proposal was viable. Their tests were met with widespread public opposition. Much of the opposition was from local residents who were not comfortable housing a high level waste repository site in their communities. “Not in my backyard” framing was common in the opposition of establishing a waste disposal site. This framing produced a view that particular regions were being targeted as potential waste disposal sites, not because they possessed geological features that made them well suited for the site, but because they lacked the large populations and political sway that could assure their self-determination. This sentiment is demonstrated by a once popular slogan “bury it on Parliament Hill”⁶⁵. However, other story lines were central to public opposition, particularly the one that claimed significant uncertainty regarding the science of deep geological waste disposal. A group of citizens in Madoc, Ontario, led by professors and geologists, formed the Committee on Radioactive Pollution to conduct their own research into the technical aspects of underground repositories. This story line was supported by their analysis that the rock formations in question could not provide the geological stability that nuclear

⁶⁴ Babin, *The Nuclear Power Game*, 156

⁶⁵ Atomic Energy of Canada Limited. *Canada Enters the Nuclear Age*, 380

waste necessitated. The appeal of this belief resulted in such intense opposition that the AECL was prevented from moving the initiative forward⁶⁶.

The arguments that arose from the issue of nuclear waste intersected with other components of the anti-nuclear narrative, particularly environmental conservation story lines that had been advanced by early environmental organizations. Quebec had long been a hotspot for anti-nuclear activism, particularly in Montreal, where La Société Pour Vaincre La Pollution (formed in 1970) was an early opponent of nuclear power on environmental grounds, and later advanced the notion that nuclear waste was an odious environmental menace. In 1978, the U.S. based Friends of the Earth formed a Canadian branch in Ottawa, which similarly argued that the ongoing creation of nuclear waste represented an environmental threat. Energy Probe, the Sierra Club of Canada, as well as a number of organized labour groups were also active in demanding more stringent nuclear regulation, and argued for the need to cease the production of nuclear waste in order to protect the environment. University chapters of student activists formed throughout the country to oppose nuclear power, which was further encouraged and expanded upon by the 1987 launching of Greenpeace's anti-uranium mining campaign⁶⁷.

Anti-nuclear groups put significant pressure on local governments to set up public forums and inquiries, and to increase the public's access to information. Aspects of the narrative were invoked which argued that a lack of transparency in the nuclear sector was covering-up corruption and a conflict of interest⁶⁸. In July of 1978, protesters began an

⁶⁶Edwards, "High-level Radioactive Wastes in Canada".

⁶⁷Sims, *The Anti-nuclear Game*, 15

⁶⁸One interesting example of how this conflict of interest has been manifested involves the Canadian government's role in establishing a uranium cartel. In 1959 the United States decided not to renew its import agreement on Canadian uranium. The resulting uranium stockpiles in Canada led to a formation of a uranium cartel in 1972, in what was a breach by the Canadian government of its own Combines Investigation Act. The cartel included South Africa, Australia, France and the private British mining firm

eighty-day vigil outside the AECB's Ottawa headquarters to demand a full public investigation into nuclear power⁶⁹. In 1979, the CCNR organized two public conferences to put pressure on the federal government to hold a debate on nuclear power, which drew in over fifty groups including organized labour, professional associations, peace groups, religious organizations and environmentalists. The collective pressure from these conferences, which occurred directly before and after the federal election, prompted Conservative leader Joe Clark to sign his name to the CCNR petition, demanding a comprehensive public investigation into the Canadian nuclear establishment⁷⁰.

Following the Three Mile Island incident, the aspects of the anti-nuclear narrative which supported that view that nuclear regulation is insufficient to protect public safety became particularly compelling to the public. From these claims emerged various story lines about potential 'doomsday' scenarios, and concerns about catastrophic accidents. Although the argument that nuclear energy produces the unavoidable potential for a nuclear catastrophe had been part of the anti-nuclear narrative for some time, it was

Rio Tinto Zinc. Through their collaborative price-fixing, covert quotas and phoney bids, the cartel successfully inflated the international value of uranium. Once prices rocketed, the Canadian government assisted its mining companies in locating and developing uranium reserves (Edwards, *Uranium*, 10). The highly secretive details of uranium price fixing by the Trudeau government were uncovered by a US congressional investigation into the issue. It was revealed that the Liberal-led government had provided assurance to the Canadian uranium companies (Eldorado Nuclear, Denison Mines, Rio Algom Mines and Gulf Minerals Canada) that "laws could be tailored" which would protect them from prosecution under the Combines Investigation Act (Tataryn, *Dying for a Living*, 66-67). In September of 1976, an order of council, under the Atomic Energy Control Act, was passed, which approved the Uranium Information Security Regulations. This law made it a legal offence, punishable by up to five years in jail, for any Canadian citizen to read about, disseminate materials on, or even discuss information related to the uranium cartel⁶⁸. Although no one was prosecuted under the law (which was widely breached), it was successful in keeping a great many documents related to the cartel classified (Gray, *The Great Uranium Cartel*, 261). The Trudeau government had to contend with staunch criticism by the Conservative opposition, who argued that the Liberals were implicit in a criminal conspiracy that infringed on not only the rights of parliament and freedom of the press, but on the democratic principles of the country. Despite taking this stance, when Clark's Conservative party was elected in 1979, it fully upheld the Uranium Information Security Regulations law that had been introduced by the Liberals. It has been speculated that this was done under pressure from the leaderships of the other countries involved in the cartel, and particularly from the Thatcher government in the UK (Gray, *The Great Uranium Cartel*, 264).

⁶⁹ Babin, *The Nuclear Power Game*, 222

⁷⁰ Babin, *The Nuclear Power Game*, 186

widely adopted by the 1980s. Story lines supporting the belief that nuclear generators were dangerous were provided by various documents and publications that attempted to show the room for mechanical glitches and human error in the civilian use of nuclear technology. One example is *The Greenpeace Book of the Nuclear Age* which documents over 50 significant nuclear mishaps that occurred between the 1950s and 1980s⁷¹.

This book, as well as other documentations of nuclear accidents, fortified the anti-nuclear narrative with the argument that nuclear mishaps are not anomalies. This public acceptance of this logic grew substantially after the Chernobyl accident, and many members of the anti-nuclear discourse coalition propagated the claim that the famous accidents at Chernobyl and Three Mile Island were only two examples in a long history of mismanagement, poor calculations and errors in judgment that have characterized the generation of nuclear energy. This story line made the case that the nuclear industry overestimated the safety of nuclear reactors in their risk assessments; the numbers of nuclear incidents that had already occurred had proven the industry's statistics on the risk of accidents wrong. Furthermore, the story line argued, the amount of secrecy behind which the nuclear industry was able to operate means that many more accidents may have occurred than the public even realized. This portion of the anti-nuclear narrative was supported by documented attempts by global nuclear industries to deny or downplay incidents⁷².

⁷¹May. *The Greenpeace Book of the Nuclear Age*

⁷²For instance, when the news of the Three Mile Island incident broke, Metropolitan Edison, the corporate manager of the Three Mile Island reactor, issued the statement that "There have been no recordings of any significant levels of radiation and none are expected outside the plant". Only after the state's Department of Environmental Resources identified leaked radiation with a Geiger counter did the company admit that they were unsure as to whether or not radiation had in fact been leaked (Rampton and Stauber, *Toxic Sludge is Good for You*, 39). Critics have argued that the nuclear sector has demonstrated an ability to keep many incidents out of the press until long past the time they occurred, which has been a highly effective way to reduce public concern and criticism. One example that has been pointed to involved an incident at a reactor

Concerns about the secrecy of the nuclear sector prompted investigation by members of the public into the insurance and liability aspects of the industry, which then produced a belief that these issues exposed an anti-democratic proclivity of nuclear policy-making. These anti-democratic tendencies resulted from the public-private intersections that occurred within the industry, and the subsidization that resulted from this merging of interests, to the detriment of the public. A collection of story lines constructed the view that the billions of dollars of subsidies⁷³ given to the nuclear sector over the years were necessary for the continued survival of the industry. Furthermore, the billions of dollars of direct subsidies were dwarfed by a much deeper method of government support, namely, the exemption of the nuclear industry from the legal requirement within the energy sector to possess unlimited third party insurance in the event of an accident. The Nuclear Liability Act requires that nuclear operators be insured for up to 75 million dollars⁷⁴. The responsibility to provide money needed beyond this amount to redress a nuclear incident resides with the federal government. In effect, this renders what has been described as an otherwise uninsurable industry insurable, since the government bears the brunt of the financial risk; even if a third party insurer could be found that was willing to incur such a risk, the insurance premium would be so high that it would be unaffordable for nuclear operators⁷⁵. In practice, according to the logic of this story line, taxpayers are funding, through subsidies, an industry for which, in the case of

in Monroe, Michigan in October of 1966. Information of this near catastrophe involving a partial meltdown of a reactor core was successfully withheld from the public for almost a decade. Only after the publication of the book *We Almost Lost Detroit*, written by one of the engineers who witnessed the meltdown, did the public learn that there had been a proposal to evacuate the entire city of Detroit, which is 64 kilometers north of the reactor site (Rampton and Stauber, *Toxic Sludge is Good for You*, 37)

⁷³ Atomic Energy of Canada Limited has received an estimated 20.9 billion dollars in government funding since the 1950s (Campbell, "Nuclear sales and service", p. 10).

⁷⁴ Department of Justice, "Nuclear Liability Act"

⁷⁵ Proops, "The (non-) economics of the nuclear fuel cycle", 15

an accident, they will be forced not only to suffer the damages of such an accident, but must also incur the costs associated with paying for these damages. The Nuclear Liability Act also protects the companies which manufacture nuclear reactor inputs from liability relating to problems caused by mechanical flaws^{76 77}. In 1987, an alliance of citizens, the City of Toronto and Energy Probe made a legal challenge against the government over the unconstitutionality of the Nuclear Liability Act. Although, in the final ruling handed down in 1994 the judge dismissed the case and awarded financial redress to the defendant, the legal challenge displayed how widely this story line had been taken-up⁷⁸.

The culmination of anger over public subsidies, regulatory problems and concerns about the potential hazards of nuclear power had become prevalent by the late 1980s. Plans to expand the nuclear power sector were overwhelmingly unpopular; by the 1990s it seemed the public image of nuclear energy had been irreparably tarnished. Despite the almost universal appeal of the anti-nuclear narrative in public discourse, the debate was never won by the anti-nuclear discourse coalition. Even though public opposition was very strong, the anti-nuclear narrative never fully came to dominate the public discourse because the nuclear lobby maintained some public influence. Although this public influence undoubtedly partly owed to its continuous political and economic sway, many

⁷⁶ Edwards, *Uranium*, 10

⁷⁷ The Nuclear Liability Act is currently being re-evaluated by the Harper government, which is proposing to extend the liability limit to 650 million dollars. However, this change does not threaten the story line that this amount is inadequate to sufficiently address a sizable nuclear accident. The estimated costs in clean-up and compensation from a nuclear incident the size of Chernobyl range from 38-314 billion dollars (Proops, "The (non-) economics of the nuclear fuel cycle", 15). An examination of the extended liability amount by Tom Adams, the head of Energy Probe, assessed the coverage for local residents of Pickering, Ontario. When the increased population density was factored in, the assessment of insurance per Pickering resident shows that liability coverage has shrunk nearly 40 percent since 1974 (Adams, "The Nuclear Shield").

⁷⁸ Jackson and Tammemagi, *Unlocking the Atom*, 118

of the pro-nuclear story lines maintained sincere credibility within the public discourse. Despite a base of ongoing support for the pro-nuclear narrative, the anti-nuclear discourse coalition had succeeded in constructing a widely held “reality” about the problems associated with nuclear energy. And although this reality did not subjugate the pro-nuclear narrative completely, it significantly reduced it by stripping its coalition of allies and its story lines of cohesiveness.

The dissolution of the anti-nuclear movement can be explained by the fact that the anti-nuclear discourse coalition had triumphed in bringing nuclear power to a standstill. Because nuclear power was widely held to be past its peak and in permanent decline, there was little left to oppose. As a result of losing a shared intersection of interest, the seams of the discourse coalition came apart. Central groups within the anti-nuclear movement were the regional organizations that formed to protest particular local projects. Having succeeded in their endeavours meant that these groups lost their *raison d'être*. Other activists had allied themselves with the anti-nuclear discourse coalition over particular aspects of nuclear power, such as the militaristic features of the industry, or its perceived environmental threats. This assembly of groups separated and focused their energy and attention on different issues that had come to the fore.

Despite the break-up of the anti-nuclear discourse coalition, many of its leaders continued to oppose the existing nuclear power plants and work towards the total phasing out of nuclear energy. However, in the absence of a united discourse coalition, the voices of these activists were marginal. Of the few anti-nuclear groups which continued with their activities, the waning public support for such organizations was reflected in their

declining budgets. For instance, Energy Probe's budget decreased from around 50,000 dollars in the 1970s, to less than 20,000 dollars by 1990⁷⁹.

Today, an anti-nuclear narrative continues to be advanced by a small, but active, force of people (many of whom were central figures in anti-nuclear discourse coalition decades ago), such the Canadian Coalition for Nuclear Responsibility, some Aboriginal groups^{80 81} and the Sierra Club of Canada⁸². Some small regional groups have formed to oppose local nuclear developments, and critics continue to stage protests against new

⁷⁹ Sims, *The Anti-Nuclear Game*, 12

⁸⁰ For example, the Ardoch and Shabot Obaadjiwan Algonquin First Nations, who in June of 2007, began a land occupation to protest a Frontenac Ventures uranium exploration project. The protesters were voicing concern over the potential contamination to land and water the test drilling could pose, and resulted in fines and arrests ("Algonquins ordered to end blockade of uranium exploration", *CBC News*)

⁸¹ Aboriginal communities have been affected by Canada's nuclear policies in different ways. As such, they have responded differently to nuclear expansion projects, and have not unanimously opposed them. However, Aboriginal peoples have been central actors in the anti-nuclear movement. The extent to which Aboriginal peoples have been adversely affected by the nuclear industry, and the significant contribution that many Aboriginal people have made in opposing and resisting the expansion of nuclear facilities in Canada cannot be given the full documentation that the issue merits; although this facet of the Canadian nuclear debate invites much further research and analysis, the comprehensive documentation that this topic deserves is outside the scope of this paper.

⁸² The Sierra Club has been a backbone of anti-nuclear activism, and continues to be today. Despite the growing support amongst environmentalists for nuclear power, the Sierra Club has consistently criticized the industry for its lax environmental standards. In 1997, The Sierra Club took the Chretien government to court after it waived its legal obligation to ensure that the sale of a CANDU reactor to China met the environmental requirements outlined by the Projects Outside of Canada Environmental Assessment Regulations under the Canadian Environmental Assessment Act. The Sierra Club also demanded a full disclosure of all documents regarding the sale of two CANDU reactors to China, arguing that since the sales were publicly funded, the Canadian public should have access to information pertaining to these projects [The public funding of these sales, along with other CANDU sales, occurs through the Economic Development Corporation (EDC)]. In court, the government argued the Crown corporation status of AECL and EDC exempted these corporations from Environmental Assessment Act provisions. The Department of Foreign Affairs further contended that the environmental regulation requirements would put Canada at a disadvantage amongst other international nuclear suppliers (Bratt, *The Politics of CANDU Exports*, 189). AECL was granted intervener status in the court case and argued that commercial confidentiality demanded that the documents of the sales remain secret. In 1999, a Federal Court judge ruled that the public had the right to access these AECL documents; numerous appeals directed the case to the Supreme Court of Canada where it was overturned in 2002. The Supreme Court ruling took the side of the AECL, arguing that the documents might contain technical details that justified confidentiality on security grounds. In his book *The Politics of CANDU Exports*, Duane Bratt remarks "The fact that Ottawa heavily subsidized the project and, in the process, was forced to amend its own environmental protection laws further indicates the significant economic interests Canada had in securing the sale"(Bratt, *The Politics of CANDU Exports*, 194).

nuclear initiatives. However, today's nuclear critics have not managed to draw in a wide base of public sympathy.

The break-up of the anti-nuclear discourse coalition, in itself, did not represent a decline of the public sphere. Although not all of the story lines invoked by the anti-nuclear narrative had been resolved, nuclear power ceased to be a galvanizing issue because no political initiatives were being put forward to revive the nuclear power sector. As the expansion of nuclear power began to reappear on Ottawa's agenda, the public sphere might have been expected to re-emerge; so far this has not occurred. The rise of the pro-nuclear narrative has not been challenged by a reassembled anti-nuclear discourse coalition. Although the anti-nuclear story lines of the past have largely retained their relevance, the anti-nuclear narrative can no longer contend with the new and highly compelling pro-nuclear story lines that now dominate the public discourse. The following chapter will examine the rise to dominance of pro-nuclear discourse.

Chapter 3: The “nuclear renaissance”

This chapter will present a discourse analysis of the contemporary pro-nuclear discourse and use examples to illustrate the extent to which this discourse has been adopted by divergent actors within Canadian society. The chapter will argue that this discourse has proven highly persuasive, and as a result, has become dominant in the public understanding of the issue. It will situate the rise of this discourse within a larger context of changing public attitudes, and the trajectory of energy policies. It will demonstrate that the strength of the pro-nuclear narrative has pushed out important information regarding nuclear power and in so doing, has prevented the re-emergence of a public sphere for this discourse.

Today’s proponents of nuclear power make up a formidable discourse coalition. Adding to the merger of government and industry in the discourse coalition are scientists and academics involved in research and development of nuclear technology (predominantly in the fields of physics and engineering), whose funding or employment is contingent on the nuclear industry. Historically, five universities in particular have been closely allied with the nuclear establishment: L’École Polytechnique de Montréal, McGill University, the University of Toronto, McMaster University and the University of British Columbia⁸³. Other universities, notably, the University of Regina and the University of Saskatchewan have also been actively involved in the nuclear sector, especially in the CANDU reactor and uranium mining industries⁸⁴.

⁸³ Babin, *The Nuclear Power Game*, 94-95

⁸⁴ Harding, *Canada’s Deadly Secret*, 115

Recipients of nuclear establishment funding include various public and community institutions. Cameco is a leading corporate sponsor, contributing money to divergent areas including hockey tournaments, community centres, university scholarships, zoos, the Juno awards, the Multiple Sclerosis Society, the Saskatoon Health Region, and Aboriginal arts events⁸⁵. Similarly, Areva Resources, Bruce Power and other nuclear businesses have made charitable donations and community developing a central method of public relations in the communities where they operate. In April, 2007, Bruce Power became a leading sponsor of The Toronto Blue Jays baseball team. As part of the agreement, Bruce Power was accorded broadcasting and advertising rights at all national Blue Jays games⁸⁶. The AECL has also made numerous high profile donations including large sums of money to the Cancer Society⁸⁷. This has created vast networks of affinities with public institutions and beneficiaries of nuclear sector funding.

Adding to these groups are shareholders, investors and employees of the industry. The promise of economic development has been an alluring tool to gain acceptance for nuclear development in new communities. For instance, Bruce Power, a private nuclear power company based in Ontario, has promised 2,700 jobs and a 12 billion dollar boom to the Alberta economy if its proposed Peace River nuclear power plant gets approved⁸⁸.

Additionally, Canada, and especially Saskatchewan, has experienced financial benefits from the economic windfalls associated with surging uranium prices on the world market. Despite recent fluctuations, the global value of uranium has reached record breaking highs over the last few years. By the middle of 2007, the price of uranium was

⁸⁵ Harding, *Canada's Deadly Secret*, 200

⁸⁶ "Blue Jays Team Up With Bruce Power". Toronto Blue Jays Official Website

⁸⁷ Atomic Energy of Canada Limited, "Newsroom"

⁸⁸ Finlayson, "Nuclear plant would create 2,700 jobs: report"

trading above 135 dollars per pound, which was more than three times its value from the previous year⁸⁹. The economic booms associated with promoting the mining and exportation of uranium has extended the scope of the nuclear lobby to encompass economically minded politicians and citizens alike.

Lastly, an important component of the pro-nuclear network is the group of citizens who support the industry on intellectual or ideological grounds. This includes nationalists who are keen to see Canada develop energy independence, or who see the industry as a key economic sector in promoting national interest. Some of these proponents of nuclear power look to predominantly nuclear-powered countries like France and Lithuania as examples of how this can be attained. Many people in favour of pursuing energy independence often situate their arguments in the context of “peak oil” and energy insecurity, and often describe nuclear power as an imperfect solution, but the only viable alternative currently available⁹⁰. This section of the pro-nuclear discourse coalition also includes members of the public who are concerned about climate change and the detrimental impact that the burning of fossil fuels has on the environment. Most recently, this group has had a surge in numbers. For these citizens who do not have any identifiable stakes in the industry, nuclear power represents a promising alternative to other forms of energy, and this is the demographic that gives today’s pro-nuclear discourse coalition unprecedented strength.

The ‘greening’ of nuclear energy:

⁸⁹ Ebner and Wallace, “Uranium exploration plans stirs health fears”

⁹⁰ “Life after death: Nuclear power is clean, but can it overcome its image problem?”. *The Economist*, 22

The Canadian nuclear lobby is broad-based, and the pro-nuclear discourse coalition is broader still. The leaders of the coalition, namely, the industry representatives and their public relations specialists, have intentionally crafted what has become the dominant discourse amongst proponents of nuclear power. The Canadian Nuclear Association slogan, “Nuclear energy: Clean, reliable, affordable” succinctly sums up the discursive construction of nuclear technologies. Of the three components of the slogan, the one which has appeared with the most consistency throughout industry advertisements and public relations documents has involved “cleanliness” rhetoric. The repetitive use of “clean”, specifically relates to clean air, which has created a point of insertion between nuclear power and what has become a central issue in Canadian public discourse: the environment. The narrow focus on “clean air” has been an effective means to detract attention away from the environmentally damaging effects of the technology on water systems, the high amounts of fuel needed for the transportation to and construction of power plants, the effects of nuclear waste on ecosystems, and the energy intensive uranium mining process⁹¹. Low CO₂ emissions has become the focal point by which the “cleanliness” of nuclear energy has been inserted into broader environmental discourse⁹². There is a clearly stated and explicit shared narrative between the “official” voices of the nuclear industry. This appears in statements on their websites. Some examples follow. The Canadian Nuclear Association website informs its readers that:

“Nuclear energy is clean. It’s North America’s largest source of emission-free energy, which means it emits no pollutants into the air.

⁹¹ Suzuki, “Energy: Nuclear”

⁹² The truth of this claim must be judged in relative terms- a study published by the Pembina Institute estimates that emissions from the domestic mining and conversion of uranium are 366,000 tonnes of carbon dioxide per year, and that each year up to 840,000 tonnes of carbon dioxide are produced through the cumulative stages involved in the generation of nuclear energy. (Winfield, “Nuclear Power in Canada”, 4)

This keeps the air clean, prevents acid rain, preserves the earth's climate and avoids ground-level ozone formation. And nuclear waste is managed in a safe, environmentally responsible way”⁹³

Similarly, Bruce Power's website states:

“Nuclear energy is experiencing a global resurgence in large part because its plants do not emit criteria pollutants or greenhouse gases when they generate electricity”.⁹⁴

The Atomic Energy of Canada Limited echoes such statements, claiming:

“AECL strives to provide solutions that address air quality and global warming, and promote a sustainable environment. AECL's environmental programs and initiatives are directly connected to all facets of the company's mission and vision. AECL strives to provide solutions that address air quality and global warming, and promote a sustainable environment”⁹⁵.

For its young internet readers, it also provides a “kid's zone” with a webpage entitled

“Mother Earth Knows Best” which states:

“We all want to keep our Earth clean and green, but every day, our atmosphere is polluted by all kinds of man-made materials. The need for environmentally friendly energy sources is greater than ever before! Luckily, nuclear power reactors are great news for the environment. This is because they don't produce any ash, smog, greenhouse gases like carbon dioxide and methane, which can contribute to global warming, or acid rain pollutants, like sulphur dioxide. In fact, there's no doubt that nuclear energy is a Clean Air energy in Canada! Since 1971, nuclear generators in Ontario, Quebec and New Brunswick have saved our country's atmosphere from over 1 billion tonnes of carbon dioxide emissions”⁹⁶.

Cameco states:

“The environmental profile of nuclear energy is critical to the industry's future. Our potential to provide a sustainable, emissions-free source of electricity to meet rapidly increasing world energy demand, depends on public acceptance and trust. At Cameco, we recognize that

⁹³ Canadian Nuclear Association home page

⁹⁴ Bruce Power homepage

⁹⁵ Atomic Energy of Canada Limited, “Sustainable development”

⁹⁶ Atomic Energy of Canada Limited, “Kid's Zone”

outstanding environmental performance is critical to earning that trust. In striving for that standard, we have adopted a clean environment as one of our measures of success and an environmental management system to facilitate continual improvement”⁹⁷.

In 2002, the Canadian Nuclear Association began a high profile advertising campaign which presented nuclear energy as the answer to air pollution⁹⁸. By 2005, such ads had become common appearances on buses, billboards, newspapers, radio stations and television throughout Ontario⁹⁹. In December 2006 a small collective of citizens groups filed a Canada’s Competition Bureau complaint in an attempt to challenge what they considered to be a misleading slogan appearing on their ads¹⁰⁰. So far the advertisements have not been retracted and continue to be used and highly visible.

The “clean air” rhetoric has been expanded into wider environmental claims to support nuclear power. The group Environmentalists For Nuclear Energy (EFN), have rallied around environmentalism, stating:

“To stop polluting our atmosphere, prevent global warming, and replace dwindling supplies of oil, EFN-CANADA promotes energy conservation, renewable energies, sustainable lifestyles, and the use of clean nuclear energy”¹⁰¹.

In June 2008, the Globe and Mail reported that “Saskatchewan has joined the nuclear boom” through a plan to build “nuclear reactors to replace the province's pollution-spewing coal-fired plants”¹⁰². Many prominent politicians have also adopted such terminology. Prime Minister Stephen Harper issued the statement:

⁹⁷ Cameco “Sustainable development”

⁹⁸ Videos and sound bites can be accessed at :<http://www.cna.ca/english/videos.asp>

⁹⁹ Hamilton, Tyler. “Environment alliance says ads misleading”.

¹⁰⁰ “Nuclear association dismisses legal challenge to its advertising” *CBC News*

¹⁰¹ Environmentalists for Nuclear Energy homepage

¹⁰² Howlett, “With two proposed reactors, Saskatchewan joins Ontario in nuclear renaissance”

“As the largest producer of uranium, we can contribute to the renaissance of nuclear energy, a no-emissions source that will be expanding around the world”¹⁰³.

In 2005, then-Minister of Natural Resources John Effin announced :

“As we’ve seen from domestic and international studies, we cannot meet [our energy] demand without nuclear energy. As a non-emitting energy source, nuclear energy can also help Canada meet its major commitments to addressing climate change — which is the topic of discussion just about everywhere you go in this country”¹⁰⁴.

Similarly, The current Minister of Natural Resources, Gary Lunn, has stated:

“As the world’s largest producer of uranium and a country taking steps to tackle climate change through the development of clean energy technology, Canada’s responsibility is to help shape the safe and secure development of nuclear energy worldwide”¹⁰⁵.

Minister Lunn’s statement also highlights the nationalist appeals often made in the pro-nuclear narrative. Many proponents of the technology express pride in the innovation of the CANDU reactor, or the “pioneering” role of Canada in providing medical isotopes to the global market.¹⁰⁶ The desire for Canada to be seen as an international leader in nuclear power is common as well, particularly in the political sphere. For Example, Saskatchewan Premier Brad Wall has publicly stated:

“We would like to lead...It's time for the country to have a new national vision on nuclear energy - and we want to aggressively pursue that”¹⁰⁷.

Also feeding into the nationalist story line is the discourse about global competition over energy sources, which presents a need to develop energy independence. This component of the pro-nuclear narrative is well illustrated by references which portray national interests as hostile to those of other nations because growing demand for

¹⁰³ Steven Harper website. “Prime Minister Harper addresses the Canada-U.K. Chamber of Commerce in London”

¹⁰⁴ Efford, “Notes for a speech to the Canadian Nuclear Association Annual Seminar”

¹⁰⁵ Natural Resources Canada, “Canada to join Global Nuclear Energy Partnership”

¹⁰⁶ Atomic Energy of Canada Limited, “Kid’s Zone”

¹⁰⁷ Howlett, “With two proposed reactors, Saskatchewan joins Ontario in nuclear renaissance”

energy abroad is pushing up domestic energy prices and leading to energy scarcity. The Canadian National Energy Board predicts that the domestic energy demand will continue to increase despite the expected future increase in energy prices¹⁰⁸. Concerns over increased prices and scarcity of resources are reinforced by forecasts of expected growth in energy demand worldwide, which often set up China and India as competitive menaces. This is demonstrated in the following report by *The New York Times*:

“Bolstered by speedy economic development and industrialization, energy demand from Asia has been one of the main contributors to higher oil prices. Over the last two years, China and India accounted for about 70 percent of the increase in energy demand and the world’s energy needs... China’s and India’s energy use is projected to double from 2005 to 2030. By 2030, the two countries will account for nearly half the increase in global demand”¹⁰⁹.

Such predications have fuelled broad calls for decreasing the reliance of North American consumers on foreign imports of all kinds, notably on food and energy. In a recent publication *Nuclear Energy Now*, the authors promote nuclear power by discussing the rise of what they call “resource nationalism”, in which nations will increasingly come into conflict with each other over the issue of resource scarcity. The authors argue that there is a dire need for “captive oil consumers” to break free from the OPEC cartel¹¹⁰. The rhetorical production of an “oil imprisonment” had been employed widely and can be viewed within a larger political context of a changing and uncertain international economic order. This rhetoric is compatible with an advancing body of protectionist story lines, but is also highly compelling because it reflects the general anxiety many people feel regarding their future security.

¹⁰⁸ National Energy Board. “Canada’s Energy Future: Reference Case and Scenarios to 2030 - Energy Demand Highlights”

¹⁰⁹ Mouawad and Werdigier. “Warning on Impact of China and India Oil Demand”

¹¹⁰ Herbst and Hopley, *Nuclear Energy Now*, 62-63

Another central element in much of the pro-nuclear discourse is an unshakable faith in science and technological innovation. Science is invoked to address everything from the effects of radioactive material on human health to toxic waste disposal. Those who remain unconvinced of the ability of science to prove nuclear technology safe are presented as simply ill-informed. The remedy for public distrust is simply a more effective system of risk communication. Elgin P. Horton, the former Vice President of Nuclear Operations for Ontario Hydro has stated:

“The public acceptability of nuclear power suffers from a lack of understanding about nuclear plants and how they operate. Much has been written about nuclear safety, the impact of radiation, and safe disposal of used nuclear fuel. While satisfactory technical answers exist in these areas, they continue to concern many members of the public. Some knowledge of how nuclear plants work is an important prerequisite to understanding the issues of concern”¹¹¹.

This has been reiterated by various proponents of the nuclear sector. One author of a book which has the stated intention of spreading knowledge to an ill-informed public writes:

“Sadly, the nuclear industry in much of the world has failed lamentably to create an understanding of nuclear power in the public mind, let alone public acceptance. It is the objective of this book to try to remedy this failure, by explaining how nuclear power stations work, particularly Canadian ones... nuclear power is a proven, safe, environmentally friendly way of generating electricity. Its only failure is to win public understanding and acceptance”¹¹².

Constant throughout the pro-nuclear discourse is the depiction of public fears as irrational. Citizens’ concerns over nuclear waste disposal are ignored or minimized. Fears are depicted as conflated or foolish, lacking a supportive base, for example:

¹¹¹ Steed, *Nuclear Power in Canada and Beyond*, xiii

¹¹² Steed, *Nuclear Power in Canada and Beyond*, xvii

“How can people be made to believe that the safe disposal of nuclear waste, which simply involves digging a hole in the ground and burying it, is completely beyond the capability of today’s technology”¹¹³

And

“As Brand and other forward-thinking environmentalists and scientists have made clear, technology has progressed to the point where activist fear mongering about the safety of nuclear energy bears no resemblance to reality”¹¹⁴

However, such irrational public fears can be remedied through awareness campaigns.

Women in Nuclear maintain:

“Globally, the goal of WIN is to make the public aware, especially women, of the benefits of nuclear and radiation applications and of the safety that ensures protection of the public and the environment”¹¹⁵.

Connections have been created between different component story lines within the pro-nuclear narrative, which has given these views a high level of consistency within the broader discourse. For example, a faith in “information” to correct public misperceptions overlaps with a common phrase appearing in much of narrative. This phrase is the “nuclear renaissance” currently underway. The term “nuclear renaissance” has been picked up and used throughout the media, often in variations of the following statement from the Financial Post:

“Once scorned, nuclear is experiencing a global renaissance, adored by public-policy makers and business leaders as a solution that ensures the lights stay on while carbon emissions go down”¹¹⁶.

Importantly, this terminology has even been adopted by those who are opposed to the expansion of nuclear power¹¹⁷. Even when used to criticize proponents of the nuclear

¹¹³ Sims, *The Anti-Nuclear Game*, 2

¹¹⁴ Moore, “Nuclear Power Can Benefit the Environment”, 104

¹¹⁵ Women In Nuclear homepage

¹¹⁶ Vieira, “Nuclear glow”

¹¹⁷ See, for example, Beck; Harris; Hanley; Caldicott

industry, such terminology lends support to the pro-nuclear discourse. The story line of the “rebirth” of the nuclear age implies an intellectual and cultural shift away from the dark days of environmental destruction caused by the careless squandering of non-renewable and polluting energy sources. The coming “renaissance” is an embrace of a future of clean air, sustainability and responsibility. Additionally, the “rebirth” metaphor suggests that nuclear power is now in a post-Three Mile Island and Chernobyl stage of development.

In his 2005 address to the Canadian Nuclear Association, former Minister of Natural Resources John Effin stated:

“We are on the threshold of a new age for nuclear energy. The theme of your seminar, “The Nuclear Renaissance,” could not be more fitting... The Government of Canada wants Canada’s nuclear energy industry to be part of the new age”¹¹⁸.

Many people have expressed excitement over what is perceived to be the certain and ineluctable path towards the future. For instance, the Mayor of North Battleford, Julian Sadlowski, has publicly stated:

“I’m very, very excited about nuclear energy. It’s the future for us in the northwest. Whether it’s in our area or any area, there it will be a benefit to Saskatchewan”¹¹⁹.

The notion of a nuclear “renaissance” corresponds to the use of both environmentalism and science in this story line. Furthermore, because the renaissance predicts a bright future ahead, added to this narrative is the faith in future technology to address current problems of radioactive waste. This is demonstrated in the following quote from the AECL:

¹¹⁸Efford, “Notes for a speech to the Canadian Nuclear Association Annual Seminar”

¹¹⁹ Paulson, “Nuclear plant report due soon”

“The uranium is kept in special metal tubes, which are bundled together and sealed, in order to make sure that none of the fuel ever comes into contact with the environment...And someday, we may be able to follow a plan developed by Canadian scientists for the safe disposal of used fuel many kilometres below the surface of the earth in the Canadian Shield”¹²⁰.

The depiction of the public knowledge vis-à-vis expert opinion is consistent with the renaissance metaphor because the segments of the public who remain critical of nuclear energy are still in the dark, and must be led out of their ignorance by the enlightened nuclear leaders. Opponents are portrayed as ill-informed, old-fashioned or irrational. This notion is reflected in statements such as:

“The mainstream environmental movement - Greenpeace, the Sierra Club, the Friends of the Earth - are still onside [the anti-nuclear movement], along with its back-to-the-buggy-age fringe. But mass protests against nuclear power stations, popular 30 years ago, are now prominently out of fashion”¹²¹.

James Lovelock, author of the Gaia Hypothesis has argued that:

“Opposition to nuclear power is based on irrational fear fed by Hollywood-style fiction, the Green lobbies and the media”¹²².

This view has been reiterated in online blogs defending nuclear power. In a response to a *New Statesman* article, one blogger writes:

"Gary in Vermont"s post at the top of this thread perfectly illustrates the utter scientific ignorance of the modern antinuclear zealot...With the likes of Mark's original article ["Why greens must learn to love nuclear power"¹²³] above, it's nice to see some common sense finally emerging among the environmentalist community -- now if those who've seen the light can only convince the scientifically challenged treehuggers to abandon their religious devotion to these outdated and false stereotypes

¹²⁰ Atomic Energy of Canada Limited, “Kid’s Zone”

¹²¹ Bauch, “Nuclear power gets green sheen”

¹²² Canadian Nuclear Association, “Massive expansion of nuclear power needed to combat global warming”, 1

¹²³ Lynas, “Why greens must learn to love nuclear power”

about nuclear power, then we might actually make some progress on climate change in this generation”¹²⁴.

The acceptability of such rhetoric can be understood by the apparently high degree of public complacency over nuclear expansion, which allows the depictions of opponents to nuclear technology as a lunatic fringe to seem more credible than they otherwise might.

Public acquiescence to nuclear technology has allowed the pro-nuclear discourse coalition to gain substantial ground in making their narrative dominant in much of Canadian society. An important element of the narrative, which has gained passive support among many citizens, involves the story line that there is a lack of credible alternatives to nuclear power. The prevalence of this rationale highlights the relative weakness of a current anti-nuclear discourse coalition. Although strong counter-arguments have been made by many energy specialists and environmentalists to argue that sufficient alternatives to nuclear power exist, these arguments have not been widely circulated or taken up¹²⁵.

The pro-nuclear narrative may, in part, appear so compelling because of its coherence between different discursive elements. There is compatibility between the highly technocratic and science-based story lines, the Canadian nationalist/energy self-sufficiency story lines, pro-economic growth/business oriented/job creation story lines¹²⁶, and the “lack of a better alternative” argument. Because of their compatibility, these discursive components are not forced to compete and create contradictions in the

¹²⁴ Msparks. Blog response for *The New Statesman*'s article “Why greens must learn to love nuclear power”

¹²⁵ For instance, alternatives to nuclear power are provided on the websites of The Rocky Mountain Institute, The David Suzuki Foundation, the Sierra Club and The Pembina Institute.

¹²⁶ Further evidence of a broad compatibility between pro-growth/business/development discourse and nuclear power is in the partnership between the nuclear and oil sectors, as seen in current proposals to power oil extraction from the Alberta tar sands with nuclear energy. Therefore, rather than being a threat to domestic oil producers, the nuclear and oil sectors have a symbiotic relationship.

discourse. This absence of contradictions makes it easier to accept particularly because the discourse has been inserted into wider environmental discourse, for which there is significant public concern. Even perceived risks of nuclear power do not sufficiently challenge the construction of nuclear energy as benign because the risks posed by radiation have been overshadowed by the perceived risks of the combination of an energy crisis and climate change. This sentiment is shown in comments such as the following by a prominent environmentalist, Stewart Brand:

“But across the board, comparing the problems of spent nuclear fuel and spent coal fuel, it's 100 to one or even 1,000 to one in terms of nuclear being more safe...Climate change puts the environmental movement in a different situation. It changes priorities. Suddenly, worrying about radiation 6,000 years from now goes down the list”¹²⁷.

This argument has been repeated in much of the pro-nuclear discourse. Another public figure, the President of Stanford University, John Hennessy argues:

“Nuclear power has to be part of the solution. Can we really understand the notion of risk? Nuclear plants vs. carbon emission– which will kill and has killed more people?”¹²⁸.

This view is taken up in countless articles and editorials in the media. In one *Globe and Mail* article, Donald Johnson argues:

“Risks are an inherent part of decision-making in public policy. When we look at nuclear power, there are obvious ones, but compared to what alternatives? Are we to abandon it on the strength of a few accidents?”¹²⁹.

Patrick Moore, who is one of the co-founders of Greenpeace, has been an important public figure in current pro-nuclear discourse. He has also taken up this line of argument,

¹²⁷ Bauch, “Nuclear power gets green sheen”

¹²⁸ Tribble, “Nuclear-power dilemma: It’s carbon-free, but comes with big questions”

¹²⁹ Johnston, “Colour nuclear power green”

and has encouraged other environmentally minded people to support nuclear power. This is demonstrated in statements such as:

“Thirty years on, my views have changed, and the rest of the environmental movement needs to update its views, too, because nuclear energy may just be the energy source that can save our planet from another possible disaster: catastrophic climate change”¹³⁰.

The Inuit organization, Nunavut Tunngavik Inc, has also adopted this line, despite their historical anti-nuclear stance. In a recent policy document the organization raised concern over melting icecaps and climate change in the Arctic, emphasizing the particularly precarious circumstances of Northern communities due to a rise in global temperatures. Retracting their former anti-mining position, the organization issued the statement:

“NTI recognizes that the use of nuclear energy to produce electricity can play an important role in the mix of solutions to reduce global emission of greenhouse gases and help prevent further climate change. NTI recognizes that uranium mined in Nunavut can make a contribution to the global reduction of greenhouse gas emissions”¹³¹.

The supplanting of concern over the perceived risk of nuclear power with concern over the perceived risk of climate change and resource scarcity has been a powerful buttress to the nuclear establishment. Based on the widespread use of pro-nuclear narrative and the results of opinion polls, it seems that an increasing number of Canadians are accepting a compromise between accepting risky technology on the one hand and the promise of an affordable energy alternative on the other.

Recently, to correspond with growing public unease over rising unemployment and an economic recession, there has been a further dimension to the pro-nuclear narrative. This dimension involves an increased focus on the job creation potential of the

¹³⁰ Moore, “Going Nuclear: A Green Makes the Case”

¹³¹ Nunavut Tunngavik Inc. “Policy Concerning Uranium Mining in Nunavut”, 7

nuclear sector, and offers the nuclear industry as a solution to job losses and economic hardship. In a demonstration of how nuclear power is a true panacea for Canadian woes, CTV News quoted Oshawa Mayor, John Gray, as saying “Hallelujah” in response to the announcement of a new local nuclear power project which promises to offer hundreds of jobs to the economically troubled region¹³². In late December of 2008, the *Niagara Falls*

Review reported:

“It’s a bright light in an otherwise dark sky. While thousands are losing their jobs in Ontario’s manufacturing sector, there is an industry on the verge of expansion. Countries around the world are taking a closer look at nuclear as a reliable source of safe power that has virtually no effect on climate change. One of the beneficiaries of that interest could be right here in Niagara Falls”¹³³.

As economic troubles worsen, such arguments are likely to seem increasingly persuasive to those who might otherwise question the wisdom in expanding the domestic nuclear sector.

Pro-nuclear story lines have been put forward by the public in various forums, notably on blogs, personal websites, and in newspaper and magazine letters to the editor. Many of these letters perfectly echo the narratives of the nuclear industry, for instance, in the following letters to the editor:

“The highly radioactive material will be safely stored until it isn’t highly radioactive, then buried in geologically stable locations where it won’t be disturbed for millions of years. The reactors will be de-commissioned using techniques that have already been used successfully, using funds that have already been set aside. [Ontario Power Generation] doesn’t have to justify the costs of nuclear energy. Accountants and risk analysts already do that. They can demonstrate, to anyone who can read, that nuclear source electricity is both cheaper and safer than either solar cells or wind power. And way safer than coal”¹³⁴.

¹³² “Ontario unveils nuclear plant expansion plans” *CTV News*

¹³³ Spiteri, “Nuclear fuels growth at local manufacturer”

¹³⁴ “Letters to the Editor” *Peterborough Examiner*

And,

“Uranium development and nuclear power would be the best thing this province ever does. All you eco-nazis need to wake up and realize that wind power and solar power aren't going to make a dent in greenhouse gas reduction. A windmill can't even produce enough power to make another windmill. Nuclear waste? At least we can put it somewhere and know where that place is instead of just tossing it in the air for everyone to breath in. Europe is far more densely populated than SK and they have been using nuclear for a half century”¹³⁵.

Importantly, these letters express sentiments that appear to be growing throughout Canadian society. While critical voices continue to express concerns and opposition to nuclear power, these voices are increasingly becoming overshadowed by what has become the dominant nuclear narrative.

Discourse and democracy:

The public's perception of nuclear power relates to the coherence and congruence of the nuclear story lines with which they are presented. Less than two decades ago, the base of support for nuclear power was so small that the future of nuclear power in Canada was uncertain, at best. The arguments used against nuclear proponents were well known and aired widely by a predominantly critical public. The incongruities between loudly vocalized criticisms from citizen groups on the one hand, and risk communication documents and public relations statements from the nuclear industry on the other, created a clash of narratives that caused controversy and prevented a simplification of the “truth” about nuclear power. The controversy caused by the clashing narratives encouraged public demands for increased information and transparency from the government and nuclear industry. This is no longer the case; relative to the past, nuclear power has lost

¹³⁵ “Saskatchewan Votes 2007-Letter” *CBC*

much of its controversy because the pro-nuclear narrative has come to dominate the public discourse.

As a result of this dominance, what much of the public now understands as objective nuclear “facts” are story lines of the pro-nuclear narrative. This narrative (of a nuclear “renaissance” in which an enlightened public are slowly coming to embrace nuclear power as a cheap, abundant and environmentally friendly energy source), has been a mobilizing force for the pro-nuclear discourse coalition. As the story lines come to be increasingly repeated, the coalition increasingly grows. Indeed, the more formidable the discourse coalition, the more compelling are their story lines, which will in turn fortify the coalition by co-opting more numbers.

As can be seen today, the strength of this coalition is reflected in opinion polls which show growing support, and in nuclear power expansion initiatives which, when publicly announced by politicians, are no longer forced to contend with substantial debate or resistance. The coalition is additionally buttressed by both active support and passive acquiescence; through casual conversations which repeat what have become “nuclear facts”; by media coverage applauding the expansion of nuclear power¹³⁶; through an uncritical acceptance of nuclear advertisements on billboards lining Ontario highways, and of Cameco sound bites broadcast on Saskatchewan radio stations, the glossy full page nuclear energy advertisements in Canadian newspapers and magazines, and Bruce Power

¹³⁶ In Michael Claw’s 1994 study of nuclear industry related newspaper coverage in Canada, he concludes that there is a remarkably pro-nuclear bias in the tone of the coverage, as well as in what types of stories appear or are excluded in the news (*Stifling Debate: Canadian Newspapers and Nuclear Power*). It is significant that the time period of this study was when opposition to nuclear power had largely pushed new nuclear energy initiatives off the political agenda. Based on my own research, a pro-nuclear bias in media coverage still appears to influence the amount and type of information that is made available to the public; I would suggest that the media has in fact become more biased since his study was undertaken. This further demonstrates the importance of what the public sphere represents in terms of exposing information to the public, which is otherwise inaccessible.

commercials playing on television stations¹³⁷. The frequency with which the pro-nuclear narrative is repeated has led to a normalization of this once highly politicized issue. This sterile framing of nuclear power has had an observable impact on public attitudes- an acceptance of the pro-nuclear narrative has been growing in the public consciousness.

The dominance of the pro-nuclear narrative can be identified by the level of institutionalization it enjoys, and whether or not the discourse has been adopted by dominant actors. Arguably, the Canadian nuclear sector has always benefitted from the consent of political leaders, and therefore, the political institutionalization of support for nuclear power (in the forms of advocating for, publicly funding, and hence, of course, permitting the continued existence of the nuclear sector) speaks to the sustained power of the industry- regardless of how widely disputed nuclear power is. Certainly, the inability of what was once a critical majority of citizens to force political leaders to phase out nuclear power speaks to the profound influence the nuclear lobby enjoys. Despite the continued existence of the nuclear establishment, the important role that public opposition played in halting nuclear developments also demonstrates the power that constituents are able to wield. Acknowledging the continuously formidable power of the nuclear establishment makes the past successes of the anti-nuclear movement all the more impressive.

Today, criticisms of nuclear power continue to be made, but unlike in the past, they are peripheral. The marginal placement of the counter arguments in public discourse has prevented the nuclear establishment from being significantly challenged in its framing of “facts”. The continued currency of this issue and the public stakes involved

¹³⁷ The latter can be viewed at: <http://www.brucepowers.com/uc/GetDocument.aspx?docid=2462>

will be demonstrated by examining some of the ongoing problems of nuclear policy-making.

Chapter 4: Nuclear policy, the public and the need for discursive democracy

This chapter will begin with an examination of the conflict of interest that has characterized the nuclear industry since its inception. It will analyze the structural weaknesses in the regulatory body of the industry and demonstrate why a public interest in and scrutiny of the nuclear sector is so crucial. The absence of broad concern over nuclear policies is problematic because it has been the public that has historically acted as the watchdog to the industry. Without public scrutiny the nuclear industry, and the politicians acting on its behalf, are granted a carte blanche to haphazardly advance their interests. Some recent examples will be given to demonstrate the ongoing need for public involvement in nuclear policy-making. These examples are: the failure of the government to respond to the concerns of Port Hope residents; the ineffectual role of the Canadian Nuclear Safety Commission as demonstrated in the Chalk River episode; the Nuclear Waste Management Organization's "Adaptive Phased Management"; and Harper's signing on to the Global Nuclear Energy Partnership. The lack of attention paid by the public to these developments has permitted the strengthened position of the pro-nuclear discourse coalition. The absence of competing story lines in nuclear discourse has prevented discursive democratic participation by Canadians on this issue.

The Canadian nuclear industry resides at a point of intersection between private and public interests. The industry can be characterized by its highly concentrated and bureaucratized nature, sheltered by protective legislation and subsidization. Atomic Energy of Canada Limited (AECL) is a crown corporation, regulated by a federal control board. The private sector merges with the crown in their manufacturing of inputs such as control rods, pressure chambers, electronic devices and other construction materials. The

corporations that provide these are collectively represented by the Canadian Nuclear Association (CNA). The CNA, which was established in 1960 in order to promote the growth of the nuclear sector, also includes Ontario, New Brunswick and Quebec's provincial electrical utilities and the Department of Foreign Affairs and International Trade (DFAIT)¹³⁸.

In effect, these separate entities form an interdependent network of parties with shared interests, all of which are deeply entrenched in federal policy making circles¹³⁹. The interdependencies between the suppliers and regulator have afforded private sector shareholders a significant degree of legislative protection and political clout. In the past, a fundamental contention within nuclear discourse concerned the intersection of business interests with government policy making¹⁴⁰. Many anti-nuclear story lines focused on the structure of this industry, and supported the view that this structure has seriously compromised the integrity of the regulatory process¹⁴¹. This claim invites an investigation into the structure of nuclear regulation.

Nuclear Regulation:

The history of atomic regulation in Canada can be traced back to the Atomic Energy Control Act of 1946, which set up the Atomic Energy Control Board (AECB) with the responsibility to regulate nuclear energy. Until 2000, the Act specified a wide array of powers for the control board. Besides being responsible for licensing and

¹³⁸ Bratt, *The Politics of CANDU Exports*, 34

¹³⁹ Knelman, *Nuclear Energy: The Unforgiving Technology*, 69

¹⁴⁰ For an illustration of this, see Report on Environmental Assessment: *Why People Say No to a Uranium Refinery at Warman, Saskatchewan* which documents the mobilization of citizens around the opposition to the building proposal and records the concerns aired by members of the public. Also, see Babin (1985).

¹⁴¹ Mehta, *Risky Business*, 43

regulating nuclear facilities, the AECB was granted the authority to give grants for research and development, to make decisions on how radioactive materials were transported and disposed of, and to accord and revoke licenses. The power of the AECB was more extensive than other federal regulatory boards, owing to the fact that the Act was created shortly after Canada's involvement in the Manhattan Project; in this context security and secrecy remained top priorities¹⁴². Because of the emphasis placed on security and confidentiality, the Act granted the AECB "declaratory power", exempting it from provincial legislation and allowing the Board to conduct their activities entirely without public hearings. The Board was an administrative body, comprised of five government appointed members, including one full-time member who acted as President. The technical and legal consultants who met and advised the Board were appointed by the Board itself¹⁴³. Historically, critics have argued that there has been a serious conflict of interest among the Board members. Until 1974, the membership of the AECB was predominantly comprised of representatives of the nuclear industry, rather than the general public. This was reflected in its budget allocations and activities which granted close to eighty percent of its funds to research and development programming within the nuclear sector, rather than on regulation procedures, such as safety related studies¹⁴⁴. 1975 saw the appointment of the first President who did not have a career within the Canadian nuclear sector. However, critics within the anti-nuclear discourse coalition have argued that this appointment did not signal a significant transformation of the AECB; there have been accusations made that it was a strategic gesture to reassure the public while simultaneously consolidating the role of the central government in the

¹⁴² Mehta, *Risky Business*, 45

¹⁴³ Babin, *The Nuclear Power Game*, 56

¹⁴⁴ Babin, *The Nuclear Power Game*, 57

development of domestic energy resources. This was done by transferring funding powers to the National Research Council of Canada (NRCC). However, the President of the NRCC had to be a member of the AECB, which effectively meant that there was no independent research funding granted. Therefore, this transfer of power did not resolve the conflict of interest, or the problem that their budget was predominantly used to subsidize nuclear sector projects rather than for regulation and safety purposes¹⁴⁵.

Although the AECB had extensive regulatory powers, the absence of permanent research facilities and small number of personnel made independent investigation difficult. These limitations effectively meant that the AECB depended for their information on the technicians and consultants who were employed in the nuclear sector. A central anti-nuclear story line is that this structural weakness, in combination with a lack of private sector funding or public participation, allowed the nuclear industry to largely self-regulate¹⁴⁶.

The structural issues have manifested themselves in various forms. Some recent examples highlight the contemporary resonance of this historical criticism:

Port Hope:

Port Hope, Ontario has long been a centre of nuclear activities in Canada. For decades it has housed enrichment facilities where uranium has been modified for military, commercial and experimental purposes. The town's nuclear legacy reaches back to 1933, when Eldorado Mining established a radium producing plant, before converting to uranium processing for the Manhattan Project in the early 1940s. In the

¹⁴⁵ Babin, *The Nuclear Power Game*, 58

¹⁴⁶ Babin, *The Nuclear Power Game*, 59

following decades, the town was used as a dumping ground for nuclear waste and construction scraps, much of which was scattered throughout the town over the years. Some of the scrap construction materials from old nuclear reactors were reused for the construction of new public and private buildings, and in the process digging and dispersing toxic soil. Only in 1975, when large quantities of radon gas were discovered in one of the town's elementary schools, did residents raise concern over the possible deleterious health consequences of the waste material¹⁴⁷. A comprehensive survey of both residential and commercial areas of the town revealed that Port Hope contains over three and a half million cubic metres of radioactive soil buried under farm fields, homes, schools and other buildings. Despite Ottawa's pledge to undergo a 260 million dollar cleanup to address the contamination, delays and over-budgeting have hindered progress¹⁴⁸.

Beyond this problem of soil contamination, the absence of a buffer zone between the Cameco-owned nuclear plant and the surrounding residential area has been a cause of concern among many medical experts and locals because of on-going pollution. A 2002 audit by the Ontario environment ministry determined that Cameco was failing to report the 500 plus kilograms of fluoride, 30 tonnes of nitrates and 20 tonnes of ammonia that they had been releasing into the air each year. Close to 60 percent of these emissions were being leaked from doors, windows, cracks and ducts¹⁴⁹. According to Cameco, fluoride emissions released from their plant in Port Hope were reduced by 60 percent

¹⁴⁷ Harris, "Nuclear Reaction", 1

¹⁴⁸ The Uranium Medical Research Centre. "Results of the Port Hope Biological Study Project Announced"

¹⁴⁹ Harris, "Nuclear Reaction", 2

from 2002 to 2006¹⁵⁰. Despite these efforts, Cameco's operating licence was suspended in July 2007, after uranium and arsenic were found to have been leaked from the plant into surrounding soil¹⁵¹. Then in May 2008, reports were issued warning of uranium, flourides and arsenic contamination of Lake Ontario caused by additional leaks from the Port Hope refinery¹⁵².

After refusals by Health Canada, Environment Canada, Natural Resources Canada and the Canadian Nuclear Safety Commission to conduct studies of the potential health risks posed by the plant, the Port Hope Biological Studies Project was set up by a community organization, the Port Hope Community Health Concerns Committee. The committee called in the Uranium Medical Research Centre, an independent clinical research group. The 2007 self-funded study involved taking urine samples from Port Hope residents, which were tested in radioisotope labs in Germany. The findings of the study, which were peer-reviewed by the European Association for Nuclear Medicine, confirmed the suspicion of residents that their health was being jeopardized. The study revealed an internal contamination amongst some residents of radioactive substances, including toxins that had never even been revealed to exist in Port Hope by the Canadian Nuclear Safety Commission or Cameco and Zircotec, the corporate owners of the facilities¹⁵³.

The unwillingness of the Canadian government to respond to the concerns of Port Hope residents highlights the potential stakes involved when the public sphere retreats. Although the refusal of the government to conduct studies into the potential health risks

¹⁵⁰ Cameco 2007 Business Review. "Risks and Risk Management"

¹⁵¹ "Self-funded study says Port Hope residents contaminated by radioactive chemicals" *CBC News*

¹⁵² Austen, "Uranium Producer warns of Lake Ontario Pollution"

¹⁵³ The Uranium Medical Research Centre. "Results of the Port Hope Biological Study Project Announced"

of radioactive pollution in Port Hope, as well as its failure to respond to the community's self-funded study may have rightfully become a national issue, it never entered public discourse. In the absence of discussion and broad public concern, the government has not been pressured to act. This inaction is not only at the expense of the Port Hope residents, but also at the expense of all residents living in close proximity to nuclear facilities that are not stringently regulated.

The Port Hope case suggests that environmental contamination caused by nuclear power facilities has a potentially broad scope; the underreporting by Cameco of its Port Hope enrichment facility is not an anomaly in the industry. The true extent of pollution from nuclear sites is difficult to ascertain because the facilities are not regularly audited. However, despite underreporting and regulatory weaknesses, the documentation that has been made suggests that environmental contamination has been a consistent problem in Canada¹⁵⁴.

¹⁵⁴ By the end of the 1970s, the uranium mines that had been operating in the Elliot Lake region of Ontario since the 1950s had contaminated eighty kilometers of Serpent River, causing further contamination to ten lakes which fed off the river system. Local water supplies were found to contain up to four times the amount of radium allowed by safety standards. The pollution of the Serpent River from the Elliot Lake mines was found to be largely responsible for radium contamination of the Great Lakes (Donnay et al. "Uranium Mining and Milling", 133).

The Key Lake mine in Saskatchewan experienced over half a dozen radioactive spills within the first six months from which it was opened, in 1982. Then, in 1984, a containment dam overflowed, leaking over one hundred million litres of radioactive water. The root of the spillage problem was found to be that the mine was built without considering the possibility that the tailings would freeze (Edwards, *Uranium*, 18).

Similar problems have occurred at other mines. In November of 1989, two million litres of toxic water were leached into a creek which feeds Saskatchewan's Wollaston Lake. The following year another spill of ninety thousand litres of radioactive water occurred at the same site (Edwards, *Uranium*, 17). Between the years of 1981 and 1989, the Saskatchewan Spill Control Program documented one hundred and twenty-five radioactive spills at the province's uranium mines (Donnay et al. "Uranium Mining and Milling for Military Purposes", 133).

These incidents have been an ongoing problem. On April 6, 2003 a mine at McArthur River, Saskatchewan experienced a flood which leaked radon gas and contaminated water ("48 Hours: The McArthur River Uranium Mine". *CBC*.). Another flood occurred on October 23, 2006 at the Cigar Lake, Saskatchewan uranium mine. This flood was so severe that the mine is not expected to resume operations until at least 2011. The sealing and pumping process to contain the radioactive spillage is expected to cost close to fifty million dollars ("Cameco chief admits errors at SK. Mine flood". *CBC*.). Also in 2006, the expansion of Cameco's Key Lake, Saskatchewan facility was halted after it was discovered to be leaking

Environmental pollution created by the nuclear power sector has largely occurred with impunity. This is partially the result of problems in applying environmental legislation to the nuclear establishment. Theoretically, nuclear facilities should be subject to review by the Environmental Assessment and Review Process (EARP) legislation, which assesses the environmental impact and potential hazards of construction and energy projects. However, the environmental regulation of construction initiatives falls under provincial jurisdiction, and the Atomic Energy Control Act mandated the AECB federal powers, which override provincial environmental regulation. As a result, nuclear facilities have not been subject to provincial environmental regulations¹⁵⁵. Consequently, the responsibility to assess the potential environmental hazards of nuclear projects has rested with the AECB, which was obligated to report “significant” or “unacceptable” hazards to the Minister of environment. Upon reporting hazards to the Minister, the issue was expected to be dealt with by the federal environmental body, after which point a public review could be recommended. However, the ambiguity over what constitutes “significant” or “unacceptable” hazards to the public has allowed the AECB broad latitude to interpret the necessity for public involvement in nuclear regulation¹⁵⁶. Section 13 of the EARP Guidelines Order allocated the responsibility to the AECB to determine when “public concern about the proposal is such that a public review is desirable”¹⁵⁷. The AECB retained the power to exempt nuclear operators from public review if the Board did not deem public concern to be

toxic selenium in quantities that the Canadian Nuclear Safety Commission reported “posed an unreasonable risk to the environment” (Treasury Board of Canada Secretariat. “Canadian Nuclear Safety Commission: Section II: Analysis of Program Activities by Strategic Outcome”.)

¹⁵⁵ Mehta, *Risky Business*, 45

¹⁵⁶ Mehta, *Risky Business*, 47

¹⁵⁷ Canadian Environmental Assessment Agency. “Environmental Assessment and Review Process (EARP) Guidelines Order”.

appropriate or defensible. Therefore, there has been no mechanism in place to allow the public to determine when licensing should be granted or revoked^{158 159}. As a result, the public could only impact licensing decisions if they exerted significant public pressure. However, the mounting of pressure required substantial public concern and the Board could determine whether or not information was enough of a concern to be released to the public. The ability to withhold information and to determine when public concern is necessary has meant that information must be actively sought out by citizens, which requires active and critical involvement. The current absence of this activism might be facilitating broad public ambivalence about the nuclear sector because there is no mechanism by which information is transparently exposed.

In June of 2000, the AECB was replaced with the Canadian Nuclear Safety Commission (CNSC), through the enactment of the Nuclear Safety and Control Act. This new act was intended to strengthen the mechanisms for regulation and enforcement, as well as to apply more stringent controls on safety measures and on possible hazards to public health and the environment¹⁶⁰. The Nuclear Safety and Control Act was also intended to improve transparency and accountability by granting increased access of nuclear sites to inspectors, as well as allowing the public access to CNSC meetings¹⁶¹. The Commission, which is appointed by the federal government, can consist of up to seven members, who in turn have a staff of around 450 people. Although the current group of Commissioners include a former Minister of Natural Resources and the

¹⁵⁸ Mehta, *Risky Business*, 47

¹⁵⁹ In 1995, The EARP was replaced with the Canadian Environmental Assessment Act, which employs similarly ambiguous language and did not close the gap for interpretation. Section 18 (3) states: "Where the responsible authority is of the opinion that public participation in the screening of a project is appropriate in the circumstances"

Canadian Environmental Assessment Agency. "Canadian Environmental Assessment Act"

¹⁶⁰ McGill University Department of Environmental Health and Safety. "CNSC replaces the AECB"

¹⁶¹ Canadian Nuclear Safety Commission. "Participate in Public Hearings"

President of the Quebec Mining Association, it also includes a practicing physician and a professor of Earth and Ocean Sciences¹⁶². Even with these changes, the CNSC has not escaped the structural flaws that led to conflicts of interest for the AECB. The major problem lies in the fact that the CNSC must report to Parliament through the Minister of Natural Resources Canada; this is the same Minister that the AECL reports through¹⁶³. Furthermore, it leaves the Minister of Natural Resources in the paradoxical position of being responsible to ensure regulation of a sector that he must simultaneously promote. The current Minister of Natural Resources, Gary Lunn, has been a strong and vocal enthusiast of nuclear power. Likewise, the former Minister, John Efford, took his role as nuclear advocate very seriously. In a 2005 speech to the CNA he stated:

“So we have the demand, we have the resource base and we have the capacity. The final crucial condition for the new age is public support. This has always been a challenge and is one that you must continue to address...recent opinion polls indicate that eight in ten Canadians believe nuclear power will be part of Canada’s future energy mix. That’s a major plus-key to the public. Come on, let’s keep it going”¹⁶⁴.

It is indicative of a major structural flaw in nuclear supervision when the Minister responsible for regulation argues that the number one objective for the nuclear establishment is gaining increased public support. This is a fundamental conflict of interest, which could easily be avoided by having the CNSC report through an independent Minister, for instance, the Minister of the Environment or the Minister of Public Safety.

Chalk River:

¹⁶² Canadian Nuclear Safety Commission, “CNSC Overview”

¹⁶³ Jackson and Tammemagi, *Unlocking the Atom*, 113

¹⁶⁴ Efford, “Notes for a speech to the Canadian Nuclear Association Annual Seminar”

The events following the closure of the AECL's Chalk River nuclear reactor on November 18, 2007 exposed other regularity failures that raise concerns over the relationship between government and the nuclear industry in Canada. The Chalk River reactor was closed after the decision was made by the former Commission President, Linda Keen, that the reactor was a safety concern. The fifty-year-old reactor, which produced medical isotopes, was not up to safety standards because it lacked an adequate back-up system, which rendered the reactor 1000 times more prone to an accident than the international standard allows. In an overruling of the CNSC decision, the Harper government ordered the plant to begin running again, and Keen was fired. The argument given for this decision by the government was that the production of the plant's medical isotopes was essential for averting a medical emergency, both in Canada and abroad. Critics of the decision argued that there were numerous other facilities world-wide which could have provided the medical isotopes in the event of supply difficulties, and point out a time lag between when production at the plant ceased and when the government notified other isotope producers of the issue. Critics, such as Alan J. Kuperman, a policy analyst for the United States' Nuclear Control Institute have argued that the world's other isotope suppliers had sufficient surplus capacity to cover the global demand; the shortage crisis resulted from the fact that they were not immediately instructed to increase their supply. Kuperman, and others, have argued that AECL chose to appeal to the government to override Keen's decision rather than to directly contact the other isotope providers because it did not want to give their competitors a larger market share in isotopes sales¹⁶⁵.

¹⁶⁵ "Canada snubbed international efforts to protect isotope supply, report says". *CBC News*

Regardless of the role that the reactor played in global isotope production, the CNSC was responsible for ensuring that the reactor met safety standards. Keen argued that, "Under the law, the commission did not have the authority to take the issue of isotopes into consideration"¹⁶⁶. In her testimony, Keen stated that the Chalk River reactor would not be licensed today by any nuclear regulator in the world¹⁶⁷.

The Chalk River episode sparked a series of allegations by the opposition, against the minority Conservative government. Liberal MP Omar Alhambra issued a statement which accused Harper of basing his decision to override the regulatory commission ruling after being consulted by the president of the Durham Conservative riding association¹⁶⁸. Whether or not the allegation is true that the decision was based on ideological grounds rather than on informed analysis of the safety issues at hand, the ability of the Prime Minister to override a regulatory body has the potential to set a dangerous precedent, and calls into question the authority of the regulatory commission altogether. Perhaps even more serious, the firing of Keen over her actions sent a strong message to the CNSC that jobs could be lost if regulation got in the way of Ottawa's agenda.

The restarting of the Chalk River reactor proved Keen's safety concerns to be correct. Since its restarting, two leaks have occurred. One of the leaks involved the release of tritium into the air; separately, fifty kilograms of radioactive water was leached from a cracked seam of the reactor tank. Although these incidents were discovered in early December, 2008, the CNSC failed to immediately report the problems or to shut down the reactor¹⁶⁹. This suggests that Harper's message to the CNSC was well

¹⁶⁶ "Risk of restarting nuclear reactor too high: Keen". *CBC News*

¹⁶⁷ O'Neil, "Clement, Keen clash over Chalk River crisis"

¹⁶⁸ "Chalk River plant to begin making radioisotopes in a week". *CBC News*

¹⁶⁹ Galloway, "Fresh reactor leaks renew concerns about safety, transparency", A4

understood: safety concerns are secondary. A disregard for safety concerns could have far reaching implications. One area where this could prove critical is in radioactive waste management.

Adaptive Phased Management:

As in the past, today nuclear waste remains a problem. Canada currently stores roughly 2.5 million bundles of used nuclear fuel at temporary storage units near or in atomic reactor sites¹⁷⁰. This number is consistently rising, corresponding to the ongoing creation of spent fuel. Each year, thirty tons of radioactive waste is produced by each nuclear power plant¹⁷¹. Even for the pro-nuclear discourse coalition, the issue of nuclear waste has posed a challenge to the cohesiveness of the pro-nuclear narrative, because the logistics of nuclear waste are such that nuclear generators are continuously creating matter for which there is no satisfactory system in place to store. The problem of waste disposal is not unique to Canada; attempts to manage nuclear waste have been highly controversial in many other nations struggling to resolve the problem of inadequate and safe storage¹⁷². Much of the controversy stems from concerns that underground storage sites cannot be guaranteed to be safe for tens of thousands of years to come, and yet there are not enough facilities above ground to deal with accumulating radioactive waste¹⁷³.

Nuclear waste is created at various stages of the nuclear fuel cycle. The first stage, the process of mining uranium ore, leaves highly radioactive mine tailings and other waste materials exposed. More than eighty percent of radioactivity from uranium mining

¹⁷⁰ Fuji-Johnson, *Deliberative Democracy*, 24

¹⁷¹ Caldicott, *Nuclear Power Is Not The Answer*, 60

¹⁷² Fawcett, "High-level Radioactive Waste in Canada"

¹⁷³ McLeish, *The Pros and Cons of Nuclear Power*, 26

is left in the tailings of mine sites. This is made more problematic by the incredibly long half-life of these radioactive materials; it is estimated that mine tailings will generate radon gas and radium for over 76,000 years¹⁷⁴.

At the mining facility, uranium ore is crushed, ground and chemically treated. This process separates waste residue from the heavy elements. Radium, and other residual chemical waste is discharged to the mine tailing pond, leaving the compound, triuranium octoxide (U_3O_8) commonly known as yellowcake. Yellowcake is dried, packaged and then shipped to a refinery. At the refinery the yellowcake is processed in one of two ways: the uranium intended for domestic purposes is treated and processed into uranium dioxide (UO_2) natural uranium, while uranium for the export market is converted into uranium hexafluoride (UF_6)¹⁷⁵. These treatment processes separate any remaining radium and other impurities from the uranium compound, thus creating additional radioactive waste. Once treated, the uranium intended for Canadian reactors is pulverized, repackaged and then shipped to a fuel fabricating facility where it is further ground, sifted, pressed into pellets and packed into zirconium alloy encased fuel bundles. These bundles are then shipped to nuclear generating stations throughout the country¹⁷⁶. The uranium to be exported is burned in fluorine gas to create a hexafluoride steam, which is then filtered into a cold trap where it is condensed into a liquid form that solidifies when it reaches room temperature. This compound is packaged and then shipped off to enrichment plants in foreign destinations¹⁷⁷.

¹⁷⁴ Harding, *Canada's Deadly Secret*, 197

¹⁷⁵ CANDU reactors are of the "heavy water" design and do not necessitate enriched fuel, whereas "light water" reactors require uranium to undergo an additional enrichment process. International permission must be granted to build an enrichment facility because enriched uranium can be used to create atomic weapons. Currently the Canadian government has been seeking approval to build enrichment facilities.

¹⁷⁶ Royal Commission on Electric Power Planning, *A Race Against Time*, 41

¹⁷⁷ Royal Commission on Electric Power Planning, *A Race Against Time*, 41

In Canada, once the fuel bundles arrive at a power plant, they are submerged in pools of water in a pressure vessel. The process of nuclear fission (the splitting of atoms) is then manipulated. This process creates incredible heat, which boils the surrounding water. The steam from the boiling water turns a turbine, which generates electricity. The rate of nuclear fission is controlled with neutron absorbing rods and cooling tanks; without these control mechanisms the uranium would overheat and melt. All nuclear reactors are built with numerous security devices and back-up systems to prevent overheating from occurring, since overheating could potentially melt the reactor core and cause large amounts of radiation to be leaked from the plant¹⁷⁸. To avoid overheating, large amounts of water are required, which is why reactors are generally built near lakes and rivers¹⁷⁹. Once the water is used as a coolant, it is often contaminated. The accumulation of irradiated coolant water at reactor sites remains a waste disposal problem; a long-term storage system for contaminated coolant has yet to be designed¹⁸⁰.

One third of a power plant's fuel rods must be removed from the nuclear reactor each year. The high level of radioactivity of these rods requires that they be securely stored for a period of 30-60 years, during which time they must be continually cooled by either air or water to avoid the burning off of their toxic contents into the atmosphere. When this cooling period is complete, these rods are then sealed in containers for storage and disposal¹⁸¹.

Most nuclear power plants are designed to produce power for roughly forty years. At the end of this time, the plant must be decommissioned and the waste disposed of.

¹⁷⁸ Hewitt and Jarvis. "Nuclear Energy in Our Time", 122-124

¹⁷⁹ Bratt, *The Politics of CANDU Exports*, 66

¹⁸⁰ Harding, *Canada's Deadly Secret*, 40

¹⁸¹ Caldicott, *Nuclear Power Is Not The Answer*, 15

The relatively short lifespan of power plants requires a decommissioning process that may take more years to complete than the plant was operational for. A minimum of ten years is required to allow two highly radioactive products, cobalt 60 and iron 55 to deteriorate enough that the reactor can be safely entered. During this time the reactor must be guarded and maintained. Only after radioactivity has diluted can the intensive process of dismantling and clean-up begin¹⁸². The waste from the plant must then be safely packaged and securely stored, as it will remain hazardous for thousands of year to come¹⁸³.

In 2002, the Nuclear Waste Management Organization (NWMO) was set up by Atomic Energy of Canada Limited (AECL), the body which collectively represents and promotes the interests of the nuclear industry, to explore future disposal possibilities for long-term storage. In 2005, after three years of examining the issue, the NWMO recommended a waste management plan to the federal government, which they called “Adaptive Phased Management”. The Adaptive Phased Management proposal was accepted by the federal government in 2007¹⁸⁴.

Adaptive Phased Management is a long-term process to establish a deep geological repository. What makes Adaptive Phased Management different from the nuclear industry’s past proposals is that the time frame is extended over three separate lengthy stages. The first stage of Adaptive Phased Management, which is to last roughly three decades, is to leave nuclear waste at the interim storage sites where it currently resides. During this time, a centralized storage site will be chosen, and a facility built. Once the three decades have passed, the “second stage” will be implemented, which will

¹⁸² McLeish, *The Pros and Cons of Nuclear Power*, 34

¹⁸³ Caldicott, *Nuclear Power Is Not The Answer*, 12

¹⁸⁴ Parliament of Canada. “Bill C-27”

either involve moving the waste to the centralized storage site in a yet to be determined place, or leaving the nuclear waste at the current interim sites for an additional thirty years. In both of these options, the waste will remain retrievable, so that the option of reprocessing spent fuel, or relocating the waste is available¹⁸⁵. Stage three, depending on which option is chosen during stage two, will require moving the waste from its location(s) into the deep underground repository. On-going monitoring of the waste will continue until a time is reached when permanent disposal is desired, at which point the repository will be sealed off, thus completing the project¹⁸⁶.

The NWMO's plan specifies that the area designated for a waste repository will require a "willing host community" inhabiting land with "suitable rock formations, possibly in the crystalline rock of the Canadian Shield, or in other formations like sedimentary rock"¹⁸⁷. The search for a proposed site will take place in the current provincial beneficiaries of the nuclear industry: Saskatchewan, Ontario, Quebec and New Brunswick, although communities in other provinces will "not be denied the opportunity to be considered"¹⁸⁸.

The NWMO claims that Adaptive Phased Management is consistent with public values; in fact, the proposal was largely shaped by public input. The organization states:

¹⁸⁵ Centralized interim storage may not occur until stage three; Adaptive Phased Management does not commit itself to a timeframe for centralized storage, but says that this option will occur in stage two "if required". The NWMO has left open the possibility of moving nuclear waste from a centralized storage site, to another site for permanent disposal, rather than using the same site for both purposes. This would require the construction of two new disposal sites rather than only one. If the sites are in different locations then two host communities will need to be found rather than only one.

¹⁸⁶ Nuclear Waste Management Organization, "Moving forward together: The future management of Canada's used nuclear fuel".

¹⁸⁷ Nuclear Waste Management Organization, "Draft Recommendation: Adaptive Phased Management".

¹⁸⁸ Nuclear Waste Management Organization, "Draft Recommendation: Adaptive Phased Management".

“The NWMO developed its recommendation after learning from technical specialists and engaging more than 15,000 interested Canadians, including 2000 Aboriginal People, in a wide-ranging dialogue on the values, principles and objectives they believe are required of a nuclear waste management approach that is socially acceptable, environmentally responsible, technically sound and economically feasible.”¹⁸⁹

The assertion that Adaptive Phased Management has broad public approval is supported by the lack of public response it has incited. The passing of the Nuclear Fuel Waste Act, and the acceptance of the NWMO’s Adaptive Phased Management proposal by the government has failed to become a source of public controversy, on the contrary, it has received very little attention of any kind by the media or the public. In France, by comparison, the 2006 proposal for a deep geological repository has caused intense opposition from environmental groups, and incited heated public and parliamentary debates¹⁹⁰.

However, the lack of controversy over the NWMO’s proposal is not necessarily indicative of broad public support, but rather, may be a reflection of the current de-politicization of nuclear power in Canada. The NWMO asserts that the public input the organization received from over “15,000 interested Canadians” ensured that there was broad public support for the proposal before it was recommended. However, in lieu of a national debate or information campaign on the issue, it seems unlikely that the NWMO proposal truly enjoys the informed consent of Canadian citizens that the organization claims it to have. Although 15,000 responses appear to be an impressive figure, the number represents half of one percent of Canadians. Furthermore, public input was gained mainly through opinion polling, surveys and focus groups; many of the

¹⁸⁹ Nuclear Waste Management Organization. “Draft Recommendation: Adaptive Phased Management”.

¹⁹⁰ “French govt backs long-term nuclear waste burial”. *Forbes*

participants had limited knowledge about the issue of nuclear waste, given the lack of information made available to the public on the issue. The *Toronto Star* reported that “most participants said they had heard little or nothing [about the issue of nuclear waste] and were shocked to learn that no long-term plan was in place before Canada opted for electricity from nuclear power¹⁹¹. The lack of knowledge about nuclear power that the participants demonstrated partly resulted from the fact that the NWMO dismissed input from respondents who insisted that phasing out nuclear power was an essential part of waste management¹⁹². The exclusion of critical perspectives has been a source of objection for the Sierra Club of Canada, who has argued that:

“[v]ery little attempt has been made to actually engage groups such as environmental, social justice or public interest groups on their own terms, and no effort has been made to engage with the claims, experiences, or information of groups who have had negative experiences with the nuclear industry”¹⁹³.

An information gap amongst participants about nuclear power was also highlighted by the lack of concern raised over the fact that Adaptive Phased Management leaves the option open for re-processing spent fuel. The NWMO states that, “Members of the public had a particular interest in reprocessing of used fuel, as it seems to be related to desirable environmental concepts of recycling and re-use”¹⁹⁴. The public notion that reprocessing spent-fuel is environmentally sound highlights the lack of information exchange and debate in current nuclear power discourse. Reprocessing spent fuel is a chemical process which involves dissolving spent fuel materials in nitric acid to separate

¹⁹¹ Calamai, “Keep Canada’s nuclear waste accessibly, says report”

¹⁹² Nuclear Waste Management Organization. “FAQ: Do Canadians support Adaptive Phased Management? How do you know?”

¹⁹³ Sierra Club of Canada, “Nuclear Waste Disposal Action Alert and Background”

¹⁹⁴ Nuclear Waste Management Organization. “Choosing the Way Forward”, 13

the uranium from plutonium¹⁹⁵. Fast breeder reactors, which are used to re-process the fuel, must be cooled with liquid sodium, which has the tendency to leak because of its low absorption. Because liquid sodium combusts when it comes into contact with air or water, the leaking of liquid sodium has been the source of serious fires, particularly during the fuel rod dissolving stage¹⁹⁶. Costs are increased because of the additional safety requirements of fast breeder reactors; reprocessed uranium is roughly 30,000 times more radioactive than uranium used in heavy water designs¹⁹⁷. This elevates the risk of environmental contamination. On average, a reprocessing facility releases fifteen thousand times more radioactivity into the environment than a regular nuclear generator¹⁹⁸.

The elevated risk of environmental contamination also exacerbates a separate problem: the potential for nuclear weapons proliferation from domestic nuclear technologies has been amplified by the reprocessing of spent fuel because it involves the separation of plutonium from the other atomic materials¹⁹⁹. The high number of leaks and spills that occurred at the Sellafield plant in Britain eventually led to the plant being shut down in 2005 following an investigation by the European Commission²⁰⁰. The investigation found that tens of thousands of gallons of radioactive nitric acid had leaked from the plant²⁰¹. This leak reportedly contained enough plutonium for twenty nuclear bombs²⁰².

¹⁹⁵ Jackson and Tammemagi. *Unlocking the Atom*, 195

¹⁹⁶ Makhijani and Saleska. "Environmental Hazards", 53

¹⁹⁷ Ramana, "Fast-breeder reactors- a dying breed"

¹⁹⁸ Alvarez, "Nuclear Recycling Fails the Test"

¹⁹⁹ Monbiot, *Heat*, 96

²⁰⁰ Monbiot, *Heat*, 91

²⁰¹ Both Norway and Ireland have entered into disputes with the British government over contamination from the UK's Sellafield reprocessing plant. The complaints involve the discharges of technetium-99 and the leeching of a number of radioactive materials into the Irish Sea. Borge Brende, Norway's Environment

Fast Breeder reactors have been shut down due to high costs and accidents in many countries, including France, Germany, Britain and Japan²⁰³. The abandonment of fast breeder reactors around the world has created problems of built-up plutonium. It is estimated that two hundred tons of plutonium are sitting at reactor sites around the world. Only a small amount of this plutonium continues to be used in MOX fuel (fuel mixed from plutonium and uranium that is compatible with most commercial reactors). Although MOX fuel reduces the amount of plutonium in spent fuel by burning up some of it, it leaves two thirds of the original amount of plutonium in its highly radioactive residual by-product. The use of MOX fuel has been unpopular internationally amongst nuclear energy using nations because it can only be recycled once or twice, and it doubles the cost of disposal²⁰⁴. It has also raised additional concerns over the risk of nuclear weapons proliferation that accompanies the international trade and transport of plutonium as a fuel source²⁰⁵.

Despite the lack of a broad public response, Adaptive Phased Management has been vehemently criticized by many of today's remaining anti-nuclear activists,

Minister has stated: "We're now finding technetium-99 in seaweed along Norway's west coast, and in Svalbard, in the high Arctic. Yet on our border with Russia, there's almost none. My officials say it must come from Sellafield" (Kirby, "Norway demands UK nuclear rethink").

²⁰² Solnit, "Reasons Not to Glow". *Orion*

²⁰³ Ramana, "Fast-breeder reactors- a dying breed".

²⁰⁴ Alvarez, "Nuclear Recycling Fails the Test".

²⁰⁵ In 1999, Transport Canada approved AECL's initiative to import MOX fuel into Canada from Russia and the United States. AECL sought approval for the import of plutonium extracted from Russian and American nuclear warheads into Chalk River, Ontario, to experiment the use of MOX fuel in commercial CANDU reactors. Although ground shipment was approved, aviation shipments were prohibited based on the elevated security risks (*Transport Canada*. "News release: Transport Canada Announces Approval of Emergency Response Assistance Plans for the Shipment of Mox Fuel"). On January 14, 2000, Canada imported a shipment of MOX fuel from the United States by helicopter. That same day, to justify the breaching of its own law banning aviation transported plutonium, the government issued a statement claiming that the law had been amended four days earlier. In November 2000, the United States National Academy of Sciences issued a report stating that processing MOX fuel in CANDU reactors would fail to meet the spent fuel security standards (McClenaghan and Muldoon. "Legal Opinion Re: Amendment to Emergency Response Plan"). This finding did not put an end to such experiments; in 2001 Canada began importing Russian weapons-grade plutonium (Ljunggren, "Canada Announces Innovative Plan To Dispose of Plutonium").

particularly the Sierra Club of Canada, the Canadian Coalition for Nuclear Responsibility, and the Assembly of First Nations. These critics have argued that Adaptive Phased Management is a shallow rhetorical scheme by the nuclear industry to placate the public's concern regarding nuclear waste. They argue that this "new" initiative is consistent with what the nuclear industry has been proposing since the 1970's: deep geological disposal of nuclear waste. Brennain Lloyd, representing the NGO network, Nuclear Waste Watch has argued:

"This is just a re-packaged version of the standard nuclear industry options...The phased approach is the worst of all worlds – it combines all the problems of site-storage, centralized storage and deep-rock disposal."²⁰⁶

Criticisms of Adaptive Phased Management have been identical to the once popular story lines of the anti-nuclear narrative. Many of these story lines reason that scientific uncertainty remains to be addressed because there have not been any new scientific dimensions to proposed methods of geologic disposal. As a result, the NWMO plan does not address the concern that unexpected future events, for instance shifts in land formations²⁰⁷, might unearth the toxic waste at some point in the future, thus exposing future generations to the harmful material.

Story lines about uncertainty are particularly relevant because Adaptive Phased Management has been designed to correspond to the continuation of nuclear power generation; the NWMO expects that over the course of stage one of Adaptive Phased Management, the amount of irradiated nuclear fuel in Canada will nearly double²⁰⁸. This

²⁰⁶ Nuclear Waste Watch. "Environmentalists Challenge Radioactive Waste Plan"

²⁰⁷ Possibly caused by human construction projects undertaken by people who are unaware of the toxic content buried underground.

²⁰⁸ Nuclear Waste Management Organization. "Choosing a Way Forward", 15

projection may prove to be a conservative estimate, because it does not take into account the anticipated expansion of nuclear power in the country. There have also been warnings made that Canada might one day be required to import other nations' nuclear waste. In 2003, the president of the NWMO, Elizabeth Dowdeswell, suggested the possibility that Canada would one day be forced to repatriate spent fuel that had been sold abroad²⁰⁹.

The NWMO's refusal to discuss the possibility of phasing out nuclear power to correspond with addressing the nuclear waste problem is a profound weakness; Adaptive Phased Management is an initiative to address a problem that is simultaneously being exacerbated. The ongoing creation of spent fuel will require a continuous period of on-site storage at reactor sites; irradiated nuclear fuel requires a period of seven to ten years before it has cooled enough that it can be transported, and therefore, there is no way to circumvent the interim storage period²¹⁰. Following this period, Adaptive Phased Management will require routine shipments from reactor sites to centralized storage. The added movement of irradiated nuclear fuel presents additional opportunity for contamination to occur²¹¹.

Long-time anti-nuclear activist, Gordon Edwards, has argued that the process to find a "solution" to nuclear waste (the Nuclear Fuel Waste Act, the establishment of the NWMO and subsequently the government's acceptance of Adaptive Phased Management) was driven by the desire to improve the industry's public relations, rather than protecting people and the environment from radioactive pollutants. He points out that dealing with the estimated 200 million tons of radioactive tailings in Canadian

²⁰⁹ "Harper leans toward rival in Kyoto". *The Globe and Mail*

²¹⁰ Edwards, "Following the Path Backwards", 18

²¹¹ Each year, roughly one million packages of highly radioactive material are shipped within Canada (Jackson and Tammemagi, *Unlocking the Atom*, 115)

mining sites is not part of the Adaptive Phased Management agenda. He draws attention to the fact that the Canadian government has neglected to pass legislation for dealing with mine waste, comparable to the United States Uranium Mill Tailings Radiation Control Act. Questioning why no body was formed to address this problem, Edwards asks:

“Is it related to the fact that nuclear power reactors are located near urban areas whereas uranium mining activities are located in sparsely populated areas up north? Is it because the nuclear industry sees the irradiated fuel issue as a public relations problem that is preventing the expansion of the industry, whereas uranium tailings are mainly impacting lakes, rivers, wildlife, food chains, and aboriginal people that are far away from the corridors of power?”²¹²

Although Adaptive Phased Management has revived the relevance of many story lines within the anti-nuclear narrative, the story lines have been muted. Anti-nuclear activists have not connected with broader segments of the public over a shared narrative, and as a result, the weak and fragmented anti-nuclear discourse coalition has been unable to challenge today’s dominant waste disposal story lines. There are a number of factors that may contribute to the public acceptance of the NWMO proposal. One possible factor is that the multi-stage structure of Adaptive Phased Management diffuses what might otherwise cause immediate public opposition because the first stage of the process is to maintain the status quo for the next thirty to sixty years; therefore it does not demand a pressing response from the public for decades to come. Another possibility is the public discourse of nuclear power has been so reduced that much of the public is not aware of this initiative. While both of these likely contribute to the lack of controversy caused by the waste disposal project, there is one very important difference between Adaptive Phased Management and past waste disposal plans; this difference entirely

²¹² Edwards, “Following the Path Backwards”

relates to its framing. The pro-nuclear discourse coalition has managed to frame Adaptive Phased Management in a highly compelling way by co-opting discursive elements of the anti-nuclear narrative.

The NWMO asserts that their approach is “creating a contract between science and society” and that besides the scientific considerations of nuclear waste management, the NWMO acknowledges that “the issue also requires consideration of environmental, economic, social and ethical concerns...the management approach must be safe and secure for people, communities and the environment; and it must be fair for current and future generations”²¹³. Although Adaptive Phased Management fails to address many of the central issues of concern for opponents of nuclear power, it has succeeded in co-opting many potential critics by using their own language in its framing. By invoking the anti-nuclear story lines of responsibility and moral obligation, Adaptive Phased Management has rhetorically bridged formerly conflicting components of nuclear discourse. This has been a momentous achievement for the pro-nuclear discourse coalition, and has strengthened their narrative considerably.

GNEP:

On November 9, 2007, the Harper government announced that Canada would be joining the U.S. led Global Nuclear Energy Partnership (GNEP). GNEP, initially proposed in 2006 by President George W. Bush mandated the promotion of nuclear energy, further integration between uranium-exporting countries and nuclear power using nations, and the advancement of fast breeder reactors, which use spent fuel. Harper’s announcement should have been highly contentious for three main reasons. First, that the unexpected announcement of Canada’s joining the GNEP followed weeks of public

²¹³ Nuclear Waste Management Organization. “The future management of Canada’s used nuclear fuel”. 6

denials by the government about involvement in the partnership²¹⁴. A second issue of particular concern is over the issue of spent fuel. The re-using of nuclear waste has been banned in Canada since the 1970s, on security grounds²¹⁵.

Third, a central aspect of the GNEP proposal is a bid to have nuclear waste returned for disposal to the original uranium exporting country, in what is described as “a cradle-to-grave fuel leasing approach”²¹⁶. If this were enacted, as the largest uranium exporter on the globe, Canada would be forced to repatriate a substantial amount of nuclear waste from countries all over the world. An official of the Department of Natural Resources issued a statement that GNEP no longer compels countries to repatriate nuclear materials for disposal²¹⁷. Regardless of this statement, the prospect of waste repatriation has not been precluded.

GNEP’s waste disposal vision is shared by a growing number of people who argue that, following the logic of comparative advantage in free-market economics, it does not make sense for small or densely populated countries, like South Korea and Armenia to invest in the research and development of repository sites for high-level radioactive waste. Rather than disposing of their waste in their own country, it would be more efficient for countries lacking adequate disposal facilities to send the toxic materials to commercially run nuclear waste facilities in a few hub countries, which could dispose of the waste for profit²¹⁸.

Like Canada, Australia is considered to be a country well suited for a commercial waste facility, both because of its central role in the global uranium trade, and because of

²¹⁴ Cheadle, “Canada to join controversial nuclear partnership”

²¹⁵ “Canada’s role in nuclear partnership unclear”. *CTV News*

²¹⁶ “GNEP element: establish reliable fuel sources”. *The Global Nuclear Energy Partnership*

²¹⁷ Cheadle, “Canada to join controversial nuclear partnership”

²¹⁸ Charpak and Garwin, *Megawatts and Megatons*, 379

geological considerations²¹⁹. In Australia, the signing on to GNEP by Prime Minister John Howard was a key election issue in 2007. The signing on to the partnership in September without a public debate is considered to be a central reason for his losing office in the November election²²⁰.

In Canada, on the other hand, few alarm bells were sounded over Canada's joining. In fact, the issue failed to raise much attention of any kind, let alone widespread controversy. The issue received only a small amount of coverage in the media. One newspaper article remarked on the level of secrecy surrounding the joining of the GNEP. The author of the article states, with an air of bewilderment, that on this issue "there's been virtually no public debate at all" and that "Harper's minority Conservative government clearly does not want to engage the Canadian public in any discussion about the initiative"²²¹. The secrecy with which Harper is pursuing nuclear advancements was also commented on in another newspaper article. Regarding the Prime Minister's diplomatic efforts to gain international permission to begin domestic uranium enrichment (permission needs to be granted because the enrichment of uranium is part of the process of bomb making), one reporter writes:

"Who knew? As it turns out, a great many people — but few in Canada and certainly not the news media whose job is to inform the public about federal policy... While Saskatchewan Premier Brad Wall has been touting his province as the "Saudi Arabia of uranium" and loudly endorsing a high-tech enrichment industry this spring, there's been silence in Ottawa: no ministerial statements, no announcements in the Commons, no friendly questions from Tory backbenchers during question period. Nowhere in the blizzard of Conservative advertising has there been any mention of this profound nuclear policy shift. Hundreds of thousands of Tory flyers delivered to Canadian households

²¹⁹ Charpak and Garwin, *Megawatts and Megatons*, 380

²²⁰ Cheadle, "Canada to join controversial nuclear partnership"

²²¹ "Canada's role in nuclear partnership unclear". *CTV News*

this spring never mentioned uranium enrichment — or nuclear power, for that matter”²²².

Even these reports did not draw much attention, perhaps because the issue has appeared so scarcely in the news it has failed to become an ‘agenda-setting issue’ - or conversely, perhaps it did not make for a central news issue because the public failed to react to the scattered and sparse coverage that did appear.

An absence of information is an important component to public ambivalence on at least some features of the nuclear issue. Regarding the enrichment of uranium and the reprocessing of spent fuel, the lack of information made available in the public, and the lack of public concern mutually reinforce each other, to the benefit of the nuclear industry. Rather than being a source of concern, the reprocessing of spent fuel has been framed as a technical, rather than a political issue. Moreover, it has been framed as a solution to reducing radioactive waste, and therefore, environmentally sound. In Britain, as in many other nuclear powered nations, by comparison, the issue of reprocessing spent fuel is hotly disputed and frequently debated²²³. It seems that in Canada, the concept of spent fuel is not well understood- and as seen with the Adaptive Phased Management panel, is more likely to be granted a nod of approval for what is perceived to be its environmental benefits than criticized for the risks associated with it.

The information gap in public discourse on nuclear power has resulted from the rise to dominance of a narrative. This rise to dominance has pushed out space for complex analysis within nuclear discourse by overshadowing contradictory story lines and blocking a perceived need for investigation. These examples illustrate both Habermas’ and Dryzek’s conception of the fundamental role that public debate, reflection

²²² Cheadle, “Tories mum on nuclear enrichment strategy”

²²³ Walker, “From Windscale to Sellafield: A history of controversy”

and involvement have in ensuring that policy-making is done for the public interest. The encroachment of private interests and the corresponding absence of a thriving public sphere have prevented the critical involvement that characterizes discursive democracy. The expansion of the nuclear sector is compatible with discursive democracy, if it arises from public approval following open investigation; the current increase in public support for nuclear power is arguably a result of the absence of balanced information. Although public approval has evidently increased, this increased approval has largely resulted from a shrinking public sphere in conjunction with a highly compelling public relations campaign launched by the nuclear industry, which exemplifies what Habermas describes as the selling of opinion, rather than from an informed assessment.

The extent to which the public sphere has been reduced is startling, given the clear pro-nuclear agenda of the current Canadian government, and the consequences that pursuing this trajectory might have for the Canadian public, present and future.

Chapter 5: Conclusions and alternative policies

The following will conclude this thesis by situating the central argument of this study within the context of climate change to focus more directly on environmental dimensions of this issue. Alternative solutions will be offered that could feasibly replace nuclear power while simultaneously addressing the pressing demand to avert climate change. These alternative suggestions will demonstrate the potentially wide scope for debate on this issue. Increased public discussion, reflection and involvement are required to re-democratize nuclear energy policy-making. An investigation of the potential benefits and costs of developing nuclear power must occur in Canadian society. The expansion of nuclear power should only be done based on consensus following from a critical and open examination of the issue by the public.

The pro-nuclear discourse coalition operates as a web of people who mobilize around a shared narrative. Although they may not be actively pursuing the same objectives, they may be instrumental in collectively establishing the targets of the dominant actors who propagate the narrative. The environmentally-friendly framing of nuclear energy is an example of this. Not only has this framing been used by the nuclear industry to reform the image it projects of itself; importantly, this framing has been used by political actors in opportunistic ways. The insertion of nuclear power into environmental discourse has been a highly effective mode of framing, and has generated unwitting support for what are arguably regressive environmental reforms. The environmental rhetoric employed by the nuclear establishment has been an effective means by which to be applauded in their supposed efforts to expand environmentally

sound energy policies. At the political level, the public acceptance of such rhetoric has potentially deeper consequences.

At the Berlin Climate Change Conference in 1999, Canada argued that nuclear energy should be included in Kyoto's Clean Development Mechanism, which would allow Canada and other developed countries to receive emission credits from transfer technology and investments in the nuclear sector of developing countries. The recent sale of two CANDU reactors to China would therefore work to raise Canada's permissible greenhouse gas levels. Despite Canada's efforts at campaigning to have nuclear energy included, it was opposed by a number of European nations based on the argument that any possible environmental benefits of nuclear power would be offset by the environmental menace of nuclear waste²²⁴. The endeavour was also perceived by some as an attempt on the part of the Canadian leadership to skirt their responsibility to enact deeper environmental initiatives.

In Canada, a critical and vocal public will be required to help meaningful environmental initiatives along. After coming to power in 2006, the Harper government reduced and suspended energy efficiency program funding, and declared the Kyoto Protocol emission reduction target of six percent unfeasible. Concurrent to touting the merits of nuclear energy because of a concern for the environment, the Conservative government also cut environmental funding for the provinces²²⁵. Many of these cuts in environmental funding were later reversed as a response to public criticism, which demonstrates the eagerness of the minority government to respond to the will of its constituents. The power of the public to pressure the government to address

²²⁴ Bratt, *The Politics of CANDU Exports*, 75

²²⁵ Monbiot, *Heat*, x-xii

environmental problems is clear, but there is an absence of reflective and critical public discussion about the particular ways in which environmental problems should be addressed. This absence of critical debate has allowed the government to gain public support for self-serving initiatives by framing these initiatives as environmentally benign. A critical investigation by the public into the wide range of possible responses to energy scarcity and climate change is an important step for the public to collectively define their interest and needs. In the case of nuclear power, the relative environmental benefits of atomic energy might appear negligible when compared to alternatives.

The issue of how to best reduce carbon emissions in order to avert further climate change continues to be explored broadly and in-depth. A general consensus has emerged among numerous experts that the excessive consumption and squandering of energy characteristic of North America and much of the wealthy world simply cannot be sustained, whether or not nuclear power is expanded. For climate change to be sufficiently addressed, ordinary citizens must be willing or forced to make lifestyle changes which include a reduction in their abundant use of heating, air conditioning, and electric devices such as clothes dryers, Christmas and other decorative lights, and other energy wasting luxuries. Travel habits, urban planning, and construction and building designs will all have to change in order to maximize efficiency²²⁶. Numerous innovations are presenting themselves as energy conserving technologies. Thermoelectric devices which capture wasted heat are one example²²⁷. It is also likely that new technologies will continue to be developed and disseminated.

²²⁶ Monbiot, *Heat*, 140

²²⁷ "Tailpipe power", *The Economist*

Numerous suggestions have been offered in conjunction with calls for energy conservation measures to address the pressing issue of energy scarcity. The most viable solutions involve a combination of alternative energy sources such as solar, geothermal and hydrogen, as well as a reorganization of energy supply models from centralized hub stations to micro-grid systems²²⁸. Additionally, much advancement has been made in co-generation technology to capture waste heat and convert it into electricity²²⁹.

Promising developments have also been emerging in the field of wind power; these developments include offshore wind stations, which can harness wind efficiently in proximity to densely populated areas without occupying vast quantities of land²³⁰. The United Kingdom, Denmark, Sweden and the Netherlands have been leaders in offshore wind farming.

One direction in which Germany is moving in its energy policies is being heralded by many people as an example for other countries to follow. The increased reliance on wind power to produce electricity has proven efficient and profitable in many German regions, some of which already derive close to a third of their electricity from wind power²³¹. Citing a recent Stanford University study, *The Economist* reported that wind power has the potential to meet close to five times the global energy demand²³². Given that nuclear power currently contributes no more than fifteen percent to world-wide energy supplies²³³, wind power could clearly help to replace the energy derived from nuclear generators.

²²⁸ Monbiot, *Heat*, 140

²²⁹ Harding, "Lifting the Uranium Curtain", 14

²³⁰ "Wind of Change". *The Economist*.

²³¹ "Wind 'could power all UK homes'". *BBC News*

²³² "Wind of Change". *The Economist*

²³³ International Atomic Energy Agency. "Nuclear's Great Expectation"

For significant changes to be made in our relationship with energy consumption, the government will have to devise and enforce a comprehensive energy conservation framework, in which alternatives are made available and affordable. This will not only require pragmatism on the part of the leadership, but also an increased amount of funding for research and development, infrastructure and subsidization to help private sector actors who find their productivity levels have slumped because of smaller or perhaps unreliable energy supplies.

Regardless of the direction of future energy policies, Canadians will still have to face their nuclear legacy. There is no other option but to act responsibly by ensuring that vast sums of money are set aside for the costly monitoring, decommissioning and clean-up of nuclear facilities, and the storage of waste, in order that they are done in the most scrupulous method possible. Adaptive Phased Management has many positive aspects, however, the initiative needs to be expanded to incorporate a comprehensive plan for the cleaning up and storage of waste from mining sites and decommissioned facilities. Most importantly, an investment into a centralized long-term radioactive waste repository should be accompanied with a serious and transparent, and most importantly, *independent*, public inquiry into all aspects of the nuclear power sector (all economic aspects, all stages of the nuclear fuel cycle, the history of the industry, its regulatory structure, its viability as a long-term and reliable source of electricity, and the environmental and health risks posed by radiation) and, in which the possibility of phasing out nuclear power completely will be explored. This investigation should involve extensive public consultation. The information from these dialogues should be made widely accessible to the broader public, who should then be encouraged to

contribute their opinions and to raise questions. This inquiry should involve all Canadians, not only those residing in the four “nuclear” provinces (New Brunswick, Ontario, Quebec and Saskatchewan) specified by the NWMO. Nuclear power should be considered to be an issue of importance to all Canadians, because of its possible impact in all parts of the nation due to the cross country transportation of radioactive materials, the possibility of wide-spread environmental contamination of radioactive particles, and because of the centralized and federally institutionalized placement of the nuclear industry in Canada. Furthermore, both Manitoba and Alberta have additional stakes in this debate, the former because it has been a central player in Canada’s nuclear history by housing an irradiated fuel producing research reactor at AECL’s Whiteshell Nuclear Research facilities (presently being decommissioned)²³⁴, the latter because of the nuclear ambitions held by many of its politicians. For such an inquiry to occur, a strong anti-nuclear narrative will have to reemerge. While this does not appear forthcoming, discourse is fluid and circumstantial changes have the ability to gradually (or suddenly, in the instance of a significant event) move a peripheral issue to the centre of public concern.

Even for the staunchest of nuclear critics, there is generally an admission made of the importance of nuclear advancements in the field of medicine. Few people are unequivocally opposed to all nuclear technology. Nuclear technology has had a profound effect on both the diagnostic and treatment procedures of diseases. These important technologies include x-rays, radioactive tracers and numerous cancer therapies. There is a clear role for the continued development of medical isotopes and medical technology.

²³⁴ The Government of Manitoba has been exempt from the NWMO’s siting candidates because it passed a law which prohibits imports into the province of irradiated nuclear fuel.- for details on this act see: Government of Manitoba “The High-level Radioactive Waste Act”.

This would require very few facilities, and would produce very little radioactive waste compared with the amounts from nuclear reactors. Furthermore, most of the materials used in radiology have short half-lives and therefore pose less of a problem for waste management²³⁵. Recent developments in the field of isotope production have demonstrated that medical isotopes can be produced in a method that is both safer and cheaper, using small “accelerators” instead of nuclear reactors²³⁶. This alternative should give Canada the impetus to replace the fifty-one year old isotope reactor at Chalk River, particularly in light of the recent contamination problems the reactor has caused.

Beyond the field of medicine, radioactive material is used in many other important technologies, including smoke detectors and land mine detectors. Once again, these require relatively small amounts of mining and processing, and do not either use or produce large quantities of the highly radioactive materials that are inevitable in nuclear energy generation. The use of small amounts of fissionable material for scientific purposes is a separate issue from the haphazard expansion of nuclear energy reactors motivated by political or economic objectives; particularly when it derives its public support based on fallacious information.

A major hurdle for the nuclear industry has consistently involved having to contend with powerful critics and a widely held distrust of radioactive technology amongst broad segments of society. The re-framing of nuclear power as a benign answer to the energy dilemma has effectively shrunk the strength and momentum of the anti-nuclear movement. This is demonstrated by the current expansion of nuclear power in various regions of Canada and a relatively weak opposition movement to governmental

²³⁵ Jackson and Tammemagi. *Unlocking the Atom*, 155

²³⁶ Galloway, “Scientist calls for new method of making medical isotopes”, A4

pro-nuclear initiatives. Furthermore, the steady increase of support for nuclear technology is reflected in opinion polls, which demonstrates that the nuclear discourse coalition is becoming stronger. Relative to past decades, the lack of opposition today has quelled demands for stronger regulation and investigation into the effects of nuclear power, which has granted industry advocates extensive leeway in their nuclear ambitions. The demonstrable gaining of public consent through rhetorical manipulation highlights the power that discourse has on public consciousness. The power of discourse on public thought showcases the vital importance of a thriving public sphere, in which citizens become engaged participants in discussions on issues that pertain to their lives. The implications of a retreating public space for debate on nuclear policies are not only significant for the future of energy development in Canada, but for the functioning of democracy itself. A re-emergence of the public sphere and a move towards discursive democracy may occur if this issue is reopened and interjected with competing perspectives.

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