



# **Risk, Scale and Exclusion in Canadian Nuclear Fuel Waste Management**

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## **Abstract**

Since the mid 1980's Canada's plans for nuclear fuel waste (NFW) management, and the authority and knowledge of the nuclear industry have been brought into question. One of the most significant contemporary challenges to the narratives and claims of the nuclear industry about the safety of NFW, its effects and its management, is the experience of Aboriginal peoples, such as the Serpent River First Nation (SRFN), with different parts of the nuclear fuel chain. This paper interrogates the means through which the nuclear industry (through the work of the newly formed Nuclear Waste Management Organization) maintains control over the production of knowledge about NFW and contains and redirects the challenges to their accounts presented by Aboriginal peoples. I identify a discourse of 'modern risk' as instrumental to the industry's success, and using insights from recent scholarship on scale and power, examine the relationship cast between the knowledge of the nuclear industry and of the SRFN. I argue that the discourse of modern risk is a scalar discourse that normalizes the claims of the nuclear industry and disqualifies those of the Serpent River First Nation by scaling knowledge.

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## I. Introduction

During one of a series of public hearings (known as the Seaborn Panel hearings) into the safety and acceptability of a proposed method for managing Canada's nuclear fuel waste (NFW), the Chief of the Serpent River First Nation<sup>2</sup> (SRFN) made the following statement:

Our concerns with this proposal are not baseless: rather, our concerns are directly the result of our actual experience with AECL, Ontario Hydro, and the nuclear fuel cycle [...] We have been affected by radioactive materials for decades and will continue to be impacted for generations by the mining of uranium in the Elliot Lake area. We have already had more than our fair share of negative impacts of the nuclear fuel cycle. (Commanda in CEAA 1977: line 623).

The Chief's comment is similar to the testimony given by many other Aboriginal groups<sup>3</sup> to the Seaborn panel. Their concerns with the concept were explicitly founded on experience (past and present) of different parts of the nuclear fuel chain<sup>4</sup>. Their testimony to the panel revealed not only a negative history of experience of the fuel chain (Stanley 2004) but also the overwhelming implication of Aboriginal peoples in its various (and usually invisible) landscapes. The Chief's comment is also evidence of a profound discontinuity between the usually invisible legacies of the nuclear fuel chain as experienced by Aboriginal peoples and the nuclear industry's narratives about the benign and safe development of nuclear power in Canada. Indeed the accounts of Aboriginal peoples, in particular of the long term effects of low level radioactivity in ecosystems and the human body, directly contradict many of the claims of the nuclear industry about the long term safety of radioactive wastes and about the historical development of nuclear power. Their accounts, such as those of the SRFN, while only part of a larger body of

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<sup>2</sup>The term "First Nation" refers to one of three types of distinct Aboriginal (Indigenous) peoples recognized by the Canadian constitution, the others being Metis, and Inuit. In this paper the term "Aboriginal peoples" includes the diverse political, linguistic and cultural groups (and nations) which constitute all three.

<sup>3</sup>According to Peters and Fearn-Duffy (2000:3), 40 Aboriginal Nations, individuals and organizations participated in these hearings. The number is in fact larger because many chiefs spoke on behalf of treaty associations or larger political associations. Chief Commanda of the SRFN for example also presented statements on behalf of the Union of Ontario Indians which represents 140 First Nations.

<sup>4</sup> The term "nuclear fuel chain" is preferred over "nuclear fuel cycle" because it more accurately portrays the linear process of nuclear power generation, where waste is the end product, while the latter portrays it inaccurately as a cycle; suggesting that the waste is incorporated back into the cycle.

public concern with NFW management and nuclear generation, present perhaps the most distinct and radical challenge to the claims and plans of the nuclear industry.

As for many other nuclear jurisdictions, the management of nuclear fuel waste (NFW) has in the last two decades become a significant public policy issue for Canada. Beginning as early as the mid 1950's, prior to the late 1960's inception of the Canadian nuclear power programme, different sectors of the Canadian nuclear industry<sup>5</sup> have lead successive efforts to develop methods to manage NFW (Auditor General 1995:3). As of 2002 this task has been taken up by the Nuclear Waste Management Organization (NWMO), a private, industry organization lead by the major owners and producers of nuclear fuel wastes such as provincial crown nuclear power utilities, and the federal crown nuclear research and development corporation Atomic Energy of Canada Limited (AECL). Methods presently under consideration include deep geologic disposal (DGD), which would see waste sealed in canisters and irretrievably buried 500m to 1km underground in the plutonic rock of the Canadian Shield<sup>6</sup>, permanent storage above or below ground at one or more central locations, and continued permanent storage at current or new nuclear reactor sites. Until 2002, when the *Federal Nuclear Waste Act* was passed, deep geologic disposal was the only method under consideration.

Until the mid 1980's, when it became obvious that DGD would need to undergo at the very least a public licensing hearing, the development of NFW management plans had been largely internal with no public or outsider scrutiny. Amidst widespread domestic and international public concern with the safety of nuclear power (deepened as a result of accidents at Chernobyl and Three Mile Island) and with increasing volumes of NFW, an independent, public environmental impact assessment was called to investigate the safety and acceptability of DGD (Murphy and Kuhn 2001). This triggered the need for proponents of DGD to find ways to justify their claims about the effects of NFW and its management, particularly its safety and acceptability, to those outside the nuclear industry. Coinciding closely with the review (and its anticipation) the

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<sup>5</sup> With respect to NFW management I use the term "nuclear industry" to refer to the influential constellation of interests (including nuclear research and development corporations and regulators, nuclear energy utilities, and government ministries) that has been relatively successful in selecting the themes and perspectives which frame questions of NFW management. While not a completely unified political constellation, it is a relatively stable, negotiated and consistent constellation of pro-nuclear interests, organizations, and actors. Fuji-Johnson (2005) makes a similar designation.

<sup>6</sup> The Canadian Shield is a plutonic bedrock formation spanning much of Ontario, Quebec, Manitoba, Saskatchewan and the North-West Territories.

notion of 'risk' became prevalent in literature produced by the nuclear industry in support of DGD.

Risk is arguably the new commonplace of many contemporary policy debates, most especially NFW management. In Canada, as in other places around the world, "risk management" has become synonymous with successfully managing NFW. The NWMO's study of methods for NFW management, as reported in its various publications (e.g., NWMO 2003a; 2004a; 2005a&b) takes the form of a comparative risk assessment, where any and all conceptualization of the effects of NFW and its management are translated into "risks." Indeed claiming to have learned the lessons of the Seaborn panel, which based on public and Aboriginal opposition to DGD recommended that it not be accepted by the federal government and further that the nuclear industry be relieved of the responsibility for managing NFW, the NWMO are attempting to make NFW management more inclusive through risk management. Suggesting that the values, priorities, and judgements of society (with a significant effort made to include those of Aboriginal peoples) are important to NFW management, they (NWMO 2003b:2) explain how these are instrumental to their assessment of risk:

It is understood that to a large extent notions of benefits and harm are societally constructed. The assessment of risk is an important example of this. While science can speak to the probability of the occurrence of an event, science cannot speak to social tolerance for its occurrence. What poses risk, how the risk should be measured, and what is considered relevant for measurement are all decisions which are influenced by societal considerations.

This paper examines the connections between risk and the production of knowledge about NFW management in Canada, in the context of the new political significance of Aboriginal peoples for the nuclear industry. The experiences of Aboriginal peoples, in particular those of the SRFN, trouble the narratives used by the nuclear industry to normalize particular accounts of the effects of NFW and its management because of the alternative historical accounts of the effects of radioactive materials they reveal, and the epistemological challenges they make. It is in the interest of the nuclear industry to keep these accounts, along with their material geographies, hidden. I present two related arguments: first, that a discourse of "modern risk" (Green 2000) is instrumental in asserting and maintaining exclusive nuclear industry control over the production of knowledge about NFW management. I suggest that modern risk is a discursive form that arises in Canadian NFW management policy making to control threats to the knowledge claims made by the nuclear industry. In privileging these claims 'modern risk' disqualifies the alternative claims about radioactivity and its effects, and about the production of knowledge over the very long term made in the historical accounts of the SRFN (and others). Second, with reference to some of

Foucault's insights about power, I argue that its spatiality must be understood in order to understand the operation of power through the discourse of modern risk (and hence its ability to marginalize and normalize). I suggest that the discourse of risk is a scalar narrative that spatializes competing knowledge claims by scaling them relative to each other.

Before presenting the empirical analysis, I first ground this project within the history of policy making about NFW, and based on a review of recent advances in the literature on risk, describe the emergence of modern risk as a historical form in the policy process. Second, since scale is a contested concept I briefly review recent debates, and then present how, in my view, scale and risk can connect in an analysis of power and marginalization. While I conclude that current NFW management policy making constitutes a politics of exclusion supported by the discourse of modern risk in which the geographies of Aboriginal peoples are marginalized, I note that the coherence and consistency of the nuclear industry's position relies on maintaining a strategic silence on the implication of Aboriginal peoples such as the SRFN in the landscape of the nuclear fuel chain.

## II. "Modern Risk"

Risk in the Canadian NFW management policy process emerged as a discourse at the same time as did the Federal Minister of the Environment's referral of the DGD concept to an independent public environmental review (the Seaborn panel). Following this decision, which ran against the wishes of the Minister of Natural Resources Canada -NRCan (who preferred an internal licensing hearing, and within whose jurisdiction nuclear energy and radioactive materials fall) there is a clear shift from the concept hazard (for example Aikin et al 1977), to the concept of 'risk' in support material prepared by AECL, nuclear power generator Ontario Hydro, The federal crown nuclear regulator (Atomic Energy Control Board-AECB), and NRCan. In this material, and over the course of the review conducted by the panel during the 1990's, a language of risk within which to evaluate NFW management aggressively emerged. This language had its roots in regulatory policy released in the years prior to the review by AECB (now called the Canadian Nuclear Safety Commission-CNSC). The AECB, anticipating a public licensing hearing for DGD, where it would be necessary to justify the concept to groups outside the nuclear industry, released regulatory policy in the mid 1980's that confirmed it as the preferred approach for Canada and established the safety standards and licensing requirements for such a facility. This document introduced risk for the first time in a significant way in order to predict, know, and determine the safety and the effects of the DGD concept (AECB 1986: R-104, 1985: R-71). In this document 'risk' replaces more extensive concepts such as "danger", "harm" and "hazard", and constitutes "safety".

An immense array of academic energy has been devoted to the determination and management of risk. A growing body of technical literature continually proposes ways and means to determine risks, and to handle “uncertainty” (e.g., Kim et al., 2004; Mawby et al. 2004; Wu 2004; Wu & Whilhite 2004). A vast social science literature persistently addresses the distribution of risks and “vulnerabilities”, models the so called social dimensions of risk, and proposes ways to determine and address vulnerabilities *to* risk (Cutter et al. 2000; Hewitt 2000, 1997; Cutter 1996, 1995; Fothergill 1996). Still more use concepts of risk to model social behaviours and threats, ranging from financial decision making and insurance to international relations (Alfaro & Kanczuk 2004; Cameron 2004; Chambers & Quiggin 2004). More critical analyses however, have connected the determination and management of risk (in both academic and policy settings) to the same sets of social forces which produce and distribute these risks (Beck et al., eds.1994, Beck 1992). Notably Beck’s work (1992) connects the multiplication of socially produced risks and doubling of risk determination and management efforts with the socialization of risk and the creation of new social orders based on risk. This work is significant because his project to understand how the production of risk alters social relations treats the determination and management of risk not as part of the solution to the presence of risk, but rather as complicit in its perpetuation. Criticisms notwithstanding (see in particular Latour 2003; Bulkley 2001; Dingwall 1999; Eden 1998) this represents a significant and radical shift in thinking about risk (Green 2000). For Beck, risks and risk determination are intimately connected in contemporary society: “consciousness determines being” (1992:23). In other words, risks ‘become’ only through experience of them: “[risks] are based on causal interpretations, and thus exist only in terms of the (scientific or anti-scientific) knowledge about them” (Beck 1992:23).

The epistemological implications of this critique are powerful, and hold important lessons for the analysis of risk as a discursive form in NFW management. First, Beck’s analysis complicates and politicises the divide between expert “determinations of risk”, and public “perceptions of risk” (1992:57-59). If experience is everything, then different experiences (and therefore knowledges) of and about risk exist because of the radically different socio-spatialities through which people experience risk. All knowledge of risk is partial, contingent and contested. Second, Beck’s analysis scrutinizes the relationships between experience, epistemology and knowledge when trying to identify and determine risks, making all claims about risk historical, limited, and local. Third, Beck’s analysis suggests that attempts to distinguish between the determination and perception of risk, claims to know *the* risk with certainty and be able to derive acceptable levels, and requirements of proof of causation are cosmetic. Rather, he suggests these are strategic manoeuvres within the politics of knowledge creation to retain or regain control of knowledge about risks and to dismiss competing claims or experiences (Beck 1992: 62-71).

Beck's theory of risk serves to illuminate the political economy of knowledge production once debates are cast *in terms of risk*. But, as certain commentators have argued (Green 2000, Castell 1991), there is no such thing as risk. Problematic about Beck's thesis is that it assumes that risks do *exist*. While risk can be used to construct accounts of fear, harm and danger, it does not describe an ontological reality: "Nothing is a risk in itself; there is no risk in reality. But on the other hand, anything *can* be a risk; it all depends on how one analyzes the danger, considers the event. As Kant might have put it, the category of risk is a category of understanding; it cannot be given in sensibility or intuition" (Ewald 1991: 199).

Questioning how and why risk becomes the central organizing structure for the production of knowledge about, and the regulation of, danger and the future (Green 2000: 78), has become an important theme of work inspired by Foucault's concept of governmentality (eg: G. Burchell et al. Eds 1991; Oels 2005; Burchell et al., 1991). In a body of work he termed governmentality, Foucault (e.g., 1991) examined the history of how society is made governable through various practices, techniques, and knowledges that operate at the level of the self (the subject, the body) as much as the level of the state. Governmentality is "a way or system of thinking about the nature of the practice of government...capable of making some form of that activity thinkable and practicable both to its practitioners and to those upon whom it is practiced" (Gordon 1991:3). It is a concept which links the macrophysics and microphysics of power to describe the ways in which the behaviour (self regulation) of subjects or members of a population is interconnected with issues of national policy and power (Gordon 1991:5, Allen 2003). This work conceives of risk as an idea which governs individual behaviour in ways consistent with the goals of the neoliberal state, making the individual an entity governable in relation to a larger population (e.g., Defert 1991; Donzelot 1991; Ewald 1991; & Castels 1991). But more specifically it also conceives of risk as a practice or knowledge through which power is exercised in pursuit of the goals of the state, and as an optics for rendering *uncertainty* governable.

Risk as a means of describing, presenting, and understanding the effects of NFW became ubiquitous with the submission of the AECL's Environmental Impact Statement- EIS (1994) to the Seaborn Panel. AECL's discussion in the EIS of the impacts to human health and safety, represents the seamless transition made from the idea of an "effect" to the idea of a risk:

One of the potential adverse effects ...would be the exposure of humans to harmful levels of radiation. The AECB and regulatory agencies in other countries have defined a measure of effect called 'radiological risk'. As used by the AECB...the radiological risk is the probability that a health effect (a fatal cancer or a serious genetic

effect) will occur to an individual or to his or her descendants (AECL 1994:272).

Subsequent testimony given by AECL, Ontario Hydro, AECB, NRCAN, and other organizations attached to the nuclear industry, about the effects of the waste and its management was translated almost entirely into risk, and notions of safety and acceptability were determined and presented in terms of risk. The ensuing Panel assessment saw risk, and with it uncertainty, become the dominant means of seeing and evaluating the impacts, safety and acceptability of NFW and its management, despite the panel's attempt to broaden the interpretation of effects<sup>7</sup> (see Murphy & Kuhn 2001).

In 1998 the Seaborn Panel recommended that the government not adopt the DGD concept, concluding based on public and Aboriginal testimony, that it was not considered safe by society and did not have social support (CEAA 1998:41). Perhaps the most fundamental recommendation made by the panel however, was that an agency be established at "arms length" from the nuclear industry to coordinate a new investigation into the long term management of NFW (CEAA 1998: 68). That these recommendations and conclusions presented a challenge to the nuclear industry and NRCAN is evident in their subsequent response. NRCAN, on behalf of the federal government responded, stating that, in accordance with their internally created *1996 Policy Framework on Radioactive Waste*, a new organization would be established, but that it would be constituted by and representative of the owners and producers of NFW (NRCAN 1998:7-8). Between 1998 and 2000, NRCAN held internal negotiations with the nuclear industry to draft the Federal *NFW Act (Act)* subsequently passed by Federal Parliament in 2002. The *Act* incorporates the NWMO as an organization of owners and producers of NFW responsible to the Federal minister of NRCAN, and provides them with the mandate to develop, study, recommend, and implement a NFW management method. It also contains a requirement to "consult" with Aboriginal peoples.

Throughout these developments risk has remained *the* analytical technique for understanding the effects of NFW and its management, especially now that renewed efforts have begun under the aegis of the NWMO. The discourse of risk in this current phase of NFW management policy making is actively engaged by the NWMO's constant emphasis on the importance of determining the risks, and handling the uncertainty implicit in the task of NFW management (NWMO 2003a:44; 2003b:2; Dowdeswell 2003). This is consistent with the *Act* which does not contain the word "effect"- only "risk" and "benefit", and which stresses the balancing of risks and benefits as the objective of NFW management. The entire

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<sup>7</sup> Despite this the Panel did not attempt to challenge the notion of risk itself or its appropriateness.

project has, by the NWMO, been cast as an exercise in risk management, where the possible effects of nuclear waste, the performance of different methods over time, and concepts such as safety, social acceptability and social justice, are articulated uniquely and entirely in terms of risk and the distribution of risk.

The examination of risk as a method of social governance has shown that risk acts as a discourse to legitimize policy goals and processes, deploy particular fields of social possibility, (re)produce social orders, and socialize actors into certain ways of being and acting (Raco 2002: 25; Green 2000: 78; Castel 1991; Ewald 1991). To describe the particular form of risk so ubiquitous in contemporary social regulation (what he calls the modern project of social attempts to control nature and the future) Green (2000:78) develops the term “modern risk”:

Modern risk is an attitude of confidence which optimistically calculates the probability of unfavourable outcomes. It thus acts on the assumption that it knows the odds and can therefore act to objectively reduce hazard, even at the global level. The world is commonly pictured as a system of statistics, an environment where human ingenuity, science and the market can be relied upon to resolve all problems (Green 2000:79).

Green’s examination of modern risk shows how contemporary discourses of risk (modern risk) sanction a particular kind of social experience and production of knowledge that conflates knowledge of the future with probability and randomness (Ewald 1991: 198); knowledge with prediction; and certainty with the calculus of probability. Importantly this connection between modernity and risk demonstrates how the purchase and powerfulness of this discourse is rooted in the commonplace of modernist ontology and epistemology that it perpetuates.

Similar work has demonstrated the connections between discourses of risk and processes of social exclusion and marginalization. After Braun (2002:63, emphasis in original) I understand marginalization to be a discursive production: “it is that which *must be excluded* from conceptual frames in order for identities- such as ‘nature’ or ‘nation’- to remain coherent and complete.” Discourses of risk have been examined as agents in the disqualification of alternative socialities, or, as Raco has put it, as “weapons against alternative discourses or forms of action” (2002:26). Discourses of risk are for example involved in the racialization of groups (Hier & Greenberg 2002); the justification of medical incarceration (Moon 2000); and the production and regulation of mental (ill)health ( Castel 1991) often through the promotion of neo-liberal policy reforms (Raco 2002). This work treats risk as an historical form that arises in processes such as policy making in order to respond to a particular threat or challenge to the *status quo*, and suggests that risk is a discourse; a set of relations established between specific bodies of knowledge and practices and forms of social control and social possibility. Though in order to explain exclusion and marginalization, the work of those reviewed above explicates

the connections between the discourse of modern risk and the empowerment of dominant regimes of truth, few if any explicitly attend to the actual processes and discursive strategies that disqualify and subjugate alternatives to these regimes.

### *Scale, modern risk and marginalization*

In their introduction to a recent special issue about the relationships between discourse and the production of marginality, guest editors Wilson and Bauder (2001: 259) observe that not only are discourses profoundly spatial, but that spatiality is a powerful ingredient of discourse. That space is a richly used resource in discursive representations of people and the production of difference has been widely noted by geographers (e.g., Sibley 1995, 1999; Smith 1999; Pratt 1999). Ideological structures for example are represented in and through space and place (Bauder 2001). Likewise, scale is a crucial element in the production of marginality (Bauder 2001; 2006). Susan Mains' investigation of immigration discourses about the US/Mexican border for example suggests that cultural values are re-inscribed into specific places and bodies through deployments of specific scalar imaginaries (2002:193). Similarly, Bauder (2001) suggests that representations of place scale particular ideological configurations which matter for the production of marginalized spaces and groups. Scale as a discursive "frame" for representing "reality" has been well documented by geographers and others (Gibson-Graham 2002, Herod and Wright 2002:217-224; Kurtz 2002; Capeck 1993; Schlosberg 1999; Towers 2000; Crump 2002).

Andrew Herod and Melissa Wright (2002:1-13) succinctly summarize recent debates on scale as coalescing around three overlapping themes, all of which touch on ontological questions about space and scale: the ontological status of scale; the appropriate means and metaphors for conceptualizing scale; and the dynamics of scale as a praxis. There is debate over whether scale is an object or idea, an ontology or epistemology (e.g., Cox 1998a,b& Jones 1998). Closely connected are a second and third set of debates over the ways in which concepts and metaphors represent and define scale, and over whether conceptions of scale as a resource of actors merely reifies scale as a naturalistic and a priori structure or connects scale to the processes through which it is produced (Wright & Herod 2002:11). Concern here is often expressed with the dualistic orientations of conceptions of scale (Gibson-Graham 2002). In response to these problems of ontology some have proposed new and supposedly anti-hierarchical and anti-territorial ontologies of scale such as networks and topologies (e.g., Leitner et al 2002; Cox 1998; Latham 2002), or have argued for new ontologies of space to replace scale (e.g., Amin 2002).

In my view scale cannot be an ontological category. Scale is socially produced and socially producing (Smith 1992:62) and, as many of the above have

pointed out, a practice read, negotiated and deployed, not a “thing”. For Katharine Jones, scale is an epistemological category; a way of knowing and apprehending, and a way of framing political spatiality that has material effects, but that does not exist beyond its community of producers as a fundamental structure of the world (1998:27, see also Mains 2002; McCann2002; Hillis et al 2002; & Kirby 2002). She suggests that scale is also an effect and product of power:

As a representational trope, scale may be implicated in enabling particular relationships of power and space that advantage some groups but disadvantage others...It is scale’s taken for granted quality that provides its power, for the rules of social order and the practices of representation go hand in hand, and scale is an element of both” (Jones 1998: 28).

Scale, as a way of knowing or apprehending (Jones 1998:28) offers a more satisfying response to the problems of ontology than do network or topological metaphors.

First, sets of relations or processes, whether this time deployed by networked (rather than discrete) associations spanning various regions, levels, and places are still problematically qualified as ‘local’ or ‘global’, or somewhere in between (e.g., Leitner et al. 2002; Cox 1998a; Latham 2002). This repeats rather than dispenses with problematic dualisms between local and global (Gibson-Graham 2002) and takes for granted the assumptions that allow relations and processes to be fixed at particular scales (Jones 1998:28). Indeed, Massey (2002: 24) cautions geographers to remember that relationships and processes (even those we call ‘global’) are always grounded, and we need to be more ready to recognize responsibility “at a distance.”

Second, the network ontology (whether proposed as an alternative ontology of scale or of space without scale, e.g., Amin 2002) offers poor ways with which to think about power (Allen 2003:64). My understanding of power and its operation is influenced by three of Foucault’s interrelated concepts: “discourse”, “normalizing power”, and “subjugated knowledges”; particularly power as a normalizing force constituted in discourse:

We must make allowance for the complex and unstable process whereby discourse can be both an instrument and an effect of power, but also a hindrance, a stumbling block, a point of resistance and a starting point for an opposing strategy. Discourse transmits and produces power; it reinforces it, but also undermines and exposes it, renders it fragile and makes it possible to thwart (Foucault 1990:101).

Discourses are powerful: they construct the objects of which they speak and they constitute particular versions of their objects as “real” (Carabine 2001:268). Power, is thus a “doing”, a dynamic and relational phenomenon that does not exist outside of action (Young 1991:32, see also Rose 1999). It “exists only in action...it is above all a relation of force” Foucault (1976: 89).

“Normalization” is for Foucault (1990: 144) a significant mechanism through which power is produced and deployed in discourse:

Such a power has to qualify, measure, appraise, and hierarchize, rather than to display itself in murderous splendour; it does not have to draw the line that separates the enemies of the sovereign from his obedient subjects; it effects distributions around the norm. I do not mean to say that the law fades into the background...but rather that the law operates more and more as a norm and that the judicial institution is increasingly incorporated into a continuum of apparatuses ...whose function are for the most part regulatory.

This is a technique of power which produces power by establishing the dividing line between the normal and the abnormal (McHoule and Grace 1993:68). Normalizing power and its operation in discourse helps to explain the production of marginality. In his concept, “subjugated knowledges,” Foucault explains the power process through which competing knowledges are privileged and disqualified. By this term he means the ways in which discourses normalize by both obscuring the experience upon which dominant knowledge is contingent and disqualifying its alternatives:

On the one hand, I am referring to the historical contents that have been buried and disguised in a functionalist coherence or formal systematization ...subjugated knowledges are thus those blocks of historical knowledge which were present but disguised within the body of functionalist and systematizing theory [...] On the other hand I believe that by subjugated knowledges one should understand something else, something which in a sense is altogether different, namely a whole set of knowledges that have been disqualified as inadequate to their task or insufficiently elaborated: naïve knowledges located low down on the hierarchy, beneath the required level of cognition or scientificity (Foucault 1976: 82).

Together these concepts reveal that discourses produce a normalizing power with consequence for the knowledges they produce and which oppose them: they function by normalizing the knowledges and experiences that enable them, and marginalizing those that oppose them. Scale, understood as a representational trope (Jones 1998:28) attunes us to the crucial ways in which normalizing power is

spatial<sup>8</sup>. As Iris Marion Young (1991: 125-126) points out in a comment about modern scientific reason, normalizing power is an inherently scaled process:

The gaze of modern scientific reason, moreover is a normalizing gaze (Foucault 1977; West 1982). It is a gaze that assesses its object according to some hierarchical standard. The rational subject does not merely observe, passing from one site to another like a tourist. In accordance with the logic of identity the scientific subject measures objects according to scales that reduce the plurality of attributes to unity. Forced to line up on calibrations that measure degrees of some general attribute, some of the particulars are devalued, defined as deviant in relation to the norm.

This observation resonates with one of the most important insights of feminist critiques of science: that the claim to universal knowledge is a trope and a “god trick”, a practice which normalizes the sociality and claims of the master subject (Haraway 1991: 189). Discourses normalize by scaling: by conflating some claims with universal applicability and resonance, and others with only particular interest. In the following analysis I suggest that the discourse of modern risk represents the relationships between competing knowledge claims as relationally scaled. In so doing, the discourse represents the knowledge of the nuclear industry as “universal” and also concrete, and the knowledge of Aboriginal peoples as “particular”; as simultaneously “local” and peripheral. I then describe how these representations exclude and marginalize the experiences and claims of the SRFN.

### III. Analysis

#### *Methodology/Method*

This study is based on a discourse analysis of work published by the NWMO over the course of their study of NFW management, and of the experiences of the Serpent River First Nation of the nuclear fuel chain obtained through archival material and oral history interviews with Elders. The intent was to understand the relationship between the experiences of the SRFN with the nuclear fuel chain and nuclear industry discourses in support of particular NFW management plans. While a wealth of published and publicly available material

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<sup>8</sup> Allen's (2003) analysis of Foucauldian power, including normalization and governmentality, concludes differently that this concept of power as an immanent and normalizing force “defies spatial definition”, and further, that “there is an emptiness precisely where the spatial and temporal mediations of power should be” (194).

was available to represent the work of the NWMO<sup>9</sup>, less recorded material was available to represent the experiences of the SRFN of the nuclear fuel chain<sup>10</sup>. As a result, archival sources were supplemented by 22 oral history interviews conducted with Elders (2003-2004). Elders were simply asked to talk about their experiences of the nuclear industry in the watershed. Following their uninterrupted account, I asked unplanned questions about events or issues they had raised. This type of interview required extensive knowledge of the nuclear and social history of the watershed on my part, and afforded them control over the information presented. Respondents were selected first by the Elders lodge<sup>11</sup> and subsequently by referral. Interviewees evenly covered both sides of a distinction present in the community between members who define themselves as “traditional” and “non-traditional”, and included most Elders still alive and living on the reserve. The accounts of different respondents were consistent with very few exceptions.

A method for discourse analysis based on Foucault’s triad discourse-power-knowledge was used to analyze and juxtapose both the discourses of the NWMO about NFW and its effects, and those of the SRFN about their experiences with the nuclear fuel chain. This method was favoured over others because it offered a clear way to identify and examine discourses and their operation, and because of its explicit theoretical and methodological emphasis on the connection of power with knowledge through discourse (Carabine 2001; Mchoule & Grace 1993). The analysis proceeded first by identifying consistent and coherent ways of speaking about or representing particular subjects (such as the effects of NFW management, or knowledge appropriate to determining its effects). Second, the operation of each identified discourse was analyzed, by identifying its effects (representations, accounts and knowledges normalized by the discourse) objects (“things” brought into and constituted by the discourse) and strategies (ways in which objects are brought into discourse and techniques through which effects are normalized).

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<sup>9</sup> Including: discussion documents, progress reports, annual reports, public consultation documents, newsletters, fact-sheets, and media releases.

<sup>10</sup> Including: transcripts from two sets of public hearings about the disposal of uranium tailings in the Serpent River watershed, and the safety and acceptability of DGD respectively, as well as written copies of speeches and submissions presented to a hearing into the expansion of the uranium mines on the watershed.

<sup>11</sup> Initial members were selected according to those thought to have had the most contact with the nuclear industry either by working in the mines or acid plant, or through watershed activities such as hunting, as well as those who had lived in the watershed before during and after the mines. This was part of a larger collaborative project with the SRFN.

### ***The Serpent River First Nation***

An Ojibway Nation located in the province of Ontario on the north shore of Lake Huron between Sault St Marie and Sudbury, the SRFN has extensive experience of the nuclear fuel chain. Their implication in its landscape began in the early 1950's with the appearance of thirteen uranium mines and mill sites operated by Rio Algom Mining Ltd and Denison Uranium Mining Ltd in the Serpent River Watershed, an area in which they actively lived, trapped, hunted and fished and whose boundaries are coextensive with their traditional territories<sup>12</sup>. The waste rock (radioactive and highly acidic "tailings") resulting from the mining and milling process was deposited in the watershed's lakes, rivers, and convenient depressions, and many documented tailings leaks and dam breakages occurred over the years, allegedly contaminating the watershed (Reckmans et al. 2003). Elders recall returning to their winter village, trap lines and hunting camps in the fall of 1954 to find these lands claimed, occupied by mine and mill operations, or contaminated (e.g., Elder SRFN July 07/04).

In 1955, to accommodate the mine and mill operations, the Federal Department of Indian Affairs (DIA-now the department of Indian Affairs and Northern Development -DIAND) approached the band to propose a sulphuric acid plant on the reserve<sup>13</sup>. Acid would be produced exclusively to service the upstream uranium mills, ensuring a cheap nearby source of acid to Rio Algom and Denison. The SRFN were denied legal representation during the consultation and leasing process (e.g., Elders SRFN July 6/04), and were told the land would be returned to them in its original condition, that there would be no negative impacts to the reserve and surrounding area, and were guaranteed lifetime jobs for themselves and their families (e.g., Elder SRFN July 22/04). Though controversial, the band approved the plant by a small margin, and allowed the DIA to enter into a 99 year lease with Noranda mines to produce acid (e.g., Elder SRFN August 16/03). The pressure for employment and income following the steady decline of the 1940's lumbering economy (in which many men on the reserve participated) in connection with the subsequent and acute decline of the quality of the watershed due to two years of uranium mining (and loss of access to hunting and trap lands) lead to high levels of unemployment and poverty as well as a renewed dependence on market employment and income to secure food (e.g., Elder SRFN July 6/04.) At this time

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<sup>12</sup> For the most part the First Nations in Ontario signed treaties with the crown ceding their lands to the crown. Reserve land (though not owned by the First Nation) is land set aside for their exclusive use, while Traditional Territory is land to which they are historically connected but which they ceded to the crown in exchange for the rights to continue using it.

<sup>13</sup> Under Canadian Law, reserve lands cannot be leased by the First Nation, only by the federal government who holds the lands in trust for the First Nation.

fur prices also dropped (e.g., Elder SRFN July 27/04). The prospect of jobs working in the acid plant was welcomed (e.g., Elder SRFN July 21/04).

In 1962, the plant was abandoned and the band left with badly contaminated reserve land (that took two decades of constant struggle with DIAND to address (Reckmans et al. 2003)) as a result of a temporary crash in demand for uranium spurred by the decision of the United States to stop stockpiling uranium. All of the uranium mined in the watershed had been for export to the US. Mining resumed soon after, when, in order to keep some of the mines open the Ontario government agreed to stockpile uranium. In the early 1970's these contracts were converted to long term contracts with Ontario Hydro (now OPG) to supply uranium for the production of nuclear power until 2010, and the mining companies expanded their operations further North into the watershed. In 1992 when cheaper higher grade uranium was more easily available in Northern Saskatchewan, OPG cancelled its contracts, and the mining companies relocated to Saskatchewan from where they continue to sell uranium to OPG. In 1996 the last mine closed and the mines, mills and tailings were decommissioned, leaving hundreds of thousands of tonnes of tailings behind dams in the watershed.

By the late 1960's band members began to perceive serious problems arising from what they judged was radioactive contamination in the watershed. They first presented their claims to an Ontario Environmental Assessment Review Board Hearing into the mining companies' proposed expansion of the uranium mines in the Serpent River watershed between 1976 and 1979. Band leaders and Elders claimed that the mines had ruined the Serpent River system, killing the fish, and contaminating hunting and fishing areas without regard for their lifestyle (SRFN 1977, 1978, 1979). They argued against the expansion of the mines citing extensive evidence of local contamination, denied by mining companies and AECB to this day. Later in 1993, and 1996 a federal environmental impact assessment began hearings into the proposed decommissioning and disposal of the uranium tailings leftover from the mining in the watershed (FEARO 1993). In 1991 and 1997 Federal hearings were held into the DGD concept (CEAA 1997; Commanda 1991). The band intervened in both sets of these hearings, presenting many of the same issues as in the expansion hearings, and basing their judgements about the present contamination and the effects of radioactivity on their experiences in the watershed. None of these interventions were of much avail. The federal government and mining companies were able to argue that the health and environmental effects noticed by the SRFN such as contaminated fish and large game animals, high levels of lung and stomach cancers, and other previously unheard of illnesses could not have resulted from the mining activities. Uranium levels (which are a federal jurisdiction on reserves) in water, fish and game, though higher than permissible provincial levels were never shown to exceed federal ones, and were therefore claimed to be safe. Instead problems were blamed on smoking, drinking, improper diet, and the abandonment of (healthy) traditional pursuits.

### ***Modern Risk: A Scaled Political Economy of Knowledge***

The discourse of Modern Risk, as it is manifest in the NWMO's work about the effects of NFW and its management, deploys a scaled political economy of knowledge. It represents "scientific and technical knowledge," with which the nuclear industry closely aligns itself, as universal, and all alternative knowledges (included in which are the knowledges of Aboriginal peoples) as particular: as simultaneously local and peripheral. These scaled representations of "Aboriginal Knowledge" on the one hand objectify it as place bound sets of data with only local ecological significance or evidence of parochial needs, and on the other hand, constitute it as abstract spiritual teachings and time- bound wisdom.

*Discursive Strategy 1: The Objectification of Uncertainty.* "Uncertainty" is an important object of the discourse of modern risk. Universalized representations of "scientific and technical knowledge" are produced by the way it is brought into and constituted by the discourse. Uncertainty is presented as the reason for risk: risk is not only the outcome of uncertainty (a situation produced by uncertainty), but is also the only reasonable mechanism able to rationalize it and restore social order made chaotic and troubling by its presence (Hier & Greenberg 2002). The NWMO's work firmly situates NFW management within the *problem* of uncertainty, constituting it as a matter of overcoming uncertainty, and managing risk: it is represented as "a conundrum that society faces", an issue that raises "long term uncertainties" (Dowdeswell 2003: paragraph 12) and that "embodies significant scientific and social complexities and uncertainties" (NWMO 2003a:21). The presence of uncertainty legitimizes not only the translation of all effects into risks (possible occurrences for which the probability and consequence are calculable) but also the adoption of risk as a rationalization technique. The wholesale adoption of risk goes hand in hand with the NWMO's assertion that "scientific and technical" knowledge is necessary for determining risk: "We are contemplating designing and licensing a system to last for periods longer than recorded history [...] what we can do is plan for the foreseeable future, act responsibly and confidently with the best science and technology in hand" (NWMO2005a: 12-13). Indeed Discourses of modern risk and modern science go hand in hand (Green 2000).

Simultaneously, modern risk objectifies 'uncertainty', constituting it as a property of the different dimensions and general conditions of NFW management, rather than a condition of the knowledge produced about these things. Uncertainty is repeatedly objectified, suggesting that it is a thing (noun) and not an epistemological condition. As the NWMO explain: "Similar to many other social issues, we are faced with making a decision *in the face of potentially significant uncertainties*. With so many *sources* of risk and scientific, technical and societal uncertainty concerning the management of used nuclear fuel..."(2003a:44emphasis

added). And further: “the future *is* uncertain and therefore the selected management approach needs to be versatile” (NWMO 2004a:28, emphasis added). The objectification of uncertainty distances it from knowledge production and secures it within objects, parameters and conditions about which knowledge is required to determine the effects of NFW. The act of distancing uncertainty from knowledge production makes it possible for knowledge to appear epistemologically robust when making claims in space time conditions where empirical experience is not possible. The distancing of uncertainty from knowledge production relaxes the epistemological boundaries of knowledge production and creates the conditions of possibility which make it legitimate to rearrange time and space (if not overcome them entirely) to make knowledge which rationalizes uncertainty.

*Discursive Strategy 2: Differentiating knowledges according to the dualism real /perceived risk.* The importance of Beck’s thesis (1992) is to direct attention to the connections between knowledge, authority, and risk determination and to the role of this community in the legitimization of particular definitions of risk in the service of the dominant (western scientific) knowledge (see also Green 2000). According to Beck, the monopoly on rationality enjoyed by scientific hazard definition stands and falls on the distinction between, and continued separation of, *real* and *perceived* risk (1992:57). The NWMO continually make use of these dualisms found in the discourse of modern risk to differentiate between the diverse knowledge claims made about the effects of NFW management on the basis of how well each appears to rationalize uncertainty, ordering and creating a hierarchy amongst them. This hierarchy privileges the rational abilities of “scientific and technical” knowledge with which industry aligns itself. For example, in an address to the nuclear lobby group the Canadian Nuclear Association<sup>14</sup>, the president of the NWMO states: “you can contribute first through your knowledge...you can contribute to our understanding of risk and uncertainty. You can describe effectively the factual basis of any inherent risks posed by different decisions and the state of scientific uncertainty so that Canadians understand the implications of their choices” (Dowdeswell 2004).

A strong and distinct separation is established between “technical and scientific knowledge” and all alternatives to it (including the knowledges of Aboriginal peoples). The first is represented as able to determine risk and rationalize uncertainty, and the latter not, as a result of the way in which they are relationally scaled. Via their constant juxtaposition, all alternative knowledges are represented as particular: spatialized as either “local” knowledge or peripheral knowledge (and therefore constituted as too specific for risk determination), and “scientific and technical knowledge” as universal and concrete.

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<sup>14</sup> The Canadian Nuclear association is a non profit organization whose purpose is to promote domestic and international acceptance of Canadian nuclear technologies.

Alternative knowledges are constantly localized by the NWMO, represented as inadequate to the task of rationalizing uncertainty because of the ways in which they are *marked* by values, interests, and place:

Scientific and technical evidence and analysis while essential to the task of assessing and addressing risk and uncertainty, cannot be the sole basis of decision making . Equally important we need to consider the values of Canadians, impacted individuals and communities. Alternative social and ethical values need to be clearly identified, and assumptions examined, throughout the study” (NWMO 2003a:49 & NWMO 2004c:25).

Here the various limitations of alternative knowledges are over emphasized by stressing the located character of their attributes. They are *embodied*-associated specifically with “individuals”, “communities” and “Canadians”; *marked*- as political and interested because of their origins in social motivations and concerns (of Canadians, individuals or communities); *located*- associated with particular territorial units or places; and finally *limited*- associated with partiality and incomplete epistemological determination because of their foundation in social interpretations of “reality”. Alternative knowledges are therefore confined epistemologically, and their ability to speak to the effects of NFW, limited. This not only diminishes their possible significance but reinforces the universality and objectivity of “scientific and technical” knowledge. This knowledge is never embodied or connected to culture, beliefs, place, moral schemes, value judgements, places, or territories. It is constituted as uncomplicated by anything that would situate, localize, limit, or otherwise compromise it by indicating contingency.

The discourse of modern risk also particularizes alternative knowledges by simultaneously representing them as *peripheral* to the rationalization of uncertainty. Peripheralized knowledge is a scaled representation that broadens the application of the knowledge, but only into areas irrelevant to determining the effects of NFW. The contradiction between the simultaneous attempts to “shrink” and “expand” the knowledge claims results in dilute and abstract knowledge: alternative knowledges are represented as too “broad” and intangible to rationalize uncertainty, while still being limited and unable to escape their localized sociality. For example, explaining their approach to uncertainty the NWMO state:

The long-term management (over hundreds, if not thousands of years) of hazardous material raises a complex set of issues. Many of these issues require...detailed technical knowledge. However, the [Citizens’] dialogue focused on the *core questions that society can best answer*: what responsibilities do we have to future generations? How should society deal with uncertainty? How should today’s society deal with decisions that were made by previous generations? ...They were carefully chosen to help facilitate a discussion among

participants *about what is important about this issue from a societal perspective* (NWMO 2004b: line 80, emphasis added).

Alternative knowledges are associated with value related social issues represented as general and contextual considerations in NFW management, as opposed to concrete considerations of risk and the power to rationalize uncertainty with which “scientific and technical knowledge” is associated.

*Representations of the Knowledges of Aboriginal Peoples.* The SRFN made the following claims about NFW management<sup>15</sup>. (1) That the nuclear industry’s claims about the safety of the DGD concept misrepresented the effects of radioactivity, especially of the long term low level effects of radioactivity in human bodies and in ecosystems. (2) That the nuclear industry’s claims to know about the long term behaviour of the DGD concept were overextended- that it was impossible to know such things let alone guarantee their safety. However, the most frequent non-legal reason provide by the NWMO for the relevance of Aboriginal peoples as a group to NFW management is that they have distinct “insights”, “needs”, and “values” as Aboriginal peoples (represented as natural characteristics of their aboriginality) (NWMO 2005a).

When specifically addressed (as opposed to simply included in a broader category) the content of what the NWMO call “Aboriginal knowledge” is represented as a body of local place specific data related to ecological or social site characterization, and simultaneously as a series of process related spiritual and traditional insights and teachings relevant for guiding the NWMO’s overall approach. For example, to pray for assistance, and to allow Elders to speak first during consultation (NWMO 2005b: 83). These representations do not accommodate, and in fact eliminate, the two claims made by the SRFN regarding NFW management above. They also obscure the negative experiences upon which these claims are based. In the NWMO’s texts, neither Aboriginal peoples, nor their knowledges are ever connected to exposure to, experience of, or the capacity to make judgements about, NFW. Here I contrast the NWMO’s scaled representation of “Aboriginal knowledge” with the content of the experiences and claims of the SRFN about things nuclear. I suggest that the ways in which these representations are scaled marginalizes the claims and the experiences of the SRFN, dismisses the implicit challenges they contain, and integrates Aboriginal peoples and their knowledges into the policy discourse in ways consistent with the aims of the NWMO.

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<sup>15</sup> Comments were restricted to the DGD concept reviewed in 1997 because the NWMO’s “Aboriginal engagement” strategies have not included consultation with the SRFN, preferring a national “one window” approach through National organizations such as the Assembly of First Nations. These organizations have no moral or constitutional authority to consult on behalf of First Nations.

The NWMO summarize their plans to incorporate what they call “Traditional Aboriginal Knowledge” into their work as follows: Our Challenge in this project is to collect and share traditional knowledge in a form that is useful to the NWMO” (Barnaby 2003a:3), and further that so called “traditional knowledge” can be used to provide information about the various physical, biological and social components of a particular landscape” (Barnaby 2003a:5). This scaled representation objectifies the knowledges of Aboriginal peoples, suggesting that they yield only local, place specific information and data unrelated to nuclear experience that is relevant only once rationalized by the NWMO. “Aboriginal knowledge” is commonly represented as bound to a local place, partial to a community, never considered able to make claims outside of the particular context defined by the NWMO, and certainly irrelevant to defining the effects of NFW and its management. That its utility is particularly reliant on the NWMO’s rationalization of it, is reinforced by the following contrast between the “Aboriginal” and “Technical and Scientific” knowledges:

**Traditional Knowledge:** a world view- Traditional knowledge is more than a simple compilation of acts drawn from local, and often remote, environments. It is a complex and sophisticated system of knowledge, drawing on centuries of wisdom and experience. Traditional knowledge systems assume that people are part of the land, not that they own it. Practitioners consider themselves true guardians...Much work will be needed to better understand whether and how it can help guide the study. **Technical Advice:**...Fifty-five of Canada’s top nuclear specialists, engineers and scientists met at McMaster University in Hamilton to discuss the technical aspects of nuclear fuel waste management...Issues explored included the nature of high level waste, active versus passive management approaches, risks and benefits associated with transportation...The report produced as a result of the workshop will identify some of the key technical issues, questions, and broad parameters that need to be addressed in the NWMO study (NWMO 2003c:3).

The content of the SRFN’s accounts of uranium mining, milling, acid production and tailings disposal in their watershed, reveals direct experience of the effects of nuclear materials, and knowledge about radioactivity likely relevant to characterizing the effects of NFW in ecosystems and human bodies. Members of the SRFN make claims about the effects of radioactivity and related contaminants in their environments, attribute high rates of cancer to water and food chain contamination, and speak of changes to fish and wildlife and of lands contaminated and altered beyond recognition. Describing the effects of radioactivity in the watershed an Elder states:

All the trees were all dying, no leaves, they were all brown. And [inaudible] a few more years went by and people were starting to get cancer. To this day, people in their 60's have cancer. My sister is one who died of cancer. My brother-in-law and my sister-in-law both died of cancer. And a few, there are a lot of people on this reserve, there was a few, there was quite a few on the reserve died of different cancers. And myself, I had a colon cancer (Elder SRFN August 05/04).

Continuing, she describes how she believes she got cancer from eating wild game contaminated with uranium: "I love my wild meat, and my husband to this day believes that's how my cancer started because of the wild, anybody would bring whatever [wild caught game], I'd eat it...I don't know. That's how I was raised, was on wild meat. To this day I like it" (Elder SRFN August 05/04).

Another Elder describes the effects of radiation on the watershed's lakes and rivers:

It spoiled, it spoiled that Serpent River water. Before, even out here, we used to be able to drink that water with a [makes a scooping gesture]. When I was a kid, we travelled quite a bit out here on that water ah, and we ah used that for drinking. There was no, "Don't this," or, "Don't do that," or, "Don't drink that," and, "Why?" and we didn't have that. Everything was still clean. That was in the '40s and '50s it was still good. But in the late '50s when things started to go haywire around here, from the mines eh [...] it destroyed our whole water line. The Serpent River. Because all the tailings came down that watershed, eh? The watershed. It destroyed a lot. It destroyed our ah, um, ah-ceremonial, our hunting grounds (Elder SRFN July 22/04).

Describing the insights gained from the contributions of Aboriginal peoples to their study, the NWMO state:

The three methods that we studied are well understood and are technically credible and viable methods. Deep geological disposal is in an advanced state of scientific and technical understanding internationally. Used fuel storage technologies have been safely demonstrated for many years at reactor sites in Canada. However, as we listened to ...Aboriginal Peoples...we understood that the most profound challenge lies not in finding an appropriate technical method, but in the *manner* in which the management approach is implemented (NWMO 2005a:67, emphasis added).

This peripheralized representation suggest that the content of “Aboriginal knowledge” is irrelevant to understanding the effects of NFW and its management because it is limited to matters external to risk, uncertainty, and the behaviour of radioactivity. Peripheralized representations also suggest that the epistemological status of “Aboriginal knowledge” is weak because it is based on spiritual, cultural, and value laden interpretations of reality. As such it is constituted as unable to contribute valid knowledge about radioactivity, NFW and its long term effects. The NWMO’s representations for example essentialize “Aboriginal Knowledge”, simultaneously abstracting and embodying it and suggesting that it is insufficiently objective and rational to characterize the effects of NFW: “Consideration will have to be given to whether ...the aboriginal sense of responsibility and stewardship has been respected; the subsistence, health, trade and spiritual needs of people have been appropriately considered...”NWMO 2003a:52). And further: “TK can provide guidance: Many aboriginal peoples have cultural guidelines that are used in the planning and decision making process. For example, the ‘seven generation’ teachings require decision makers to consider the impact of their choices on future generations and not just their own” (Barnaby 2003:7). The knowledges of Aboriginal peoples thus scaled, become a set of trivial concerns and of abstracted principles which do not and cannot challenge the premises or foundations of scientific knowledge or speak to concrete matters.

In addition to containing relevant content, the discourse used by the SRFN to narrate their experiences and legitimize their claims about the effects of radioactivity, emphasizes the role of lived quotidian experience in the production of knowledge, and privileges embedded, local and explicitly situated epistemological techniques. This is also a scaled representation. The SRFN’s knowledge is explicitly and consciously territorially, temporally, and historically bounded by experiential space.

The SRFN’s accounts are explicitly and consciously partial, especially with respect to the spatio-temporal scale of knowledge claims. For example, contrasting their convention of thinking “seven generations into the future”, with the space-time horizons of nuclear industry knowledge about the effects of radioactivity, the SRFN explicitly balance the responsibility to consider future well being with the ability to make knowledge claims outside of the space-time limits of experience. Speaking about uranium tailings, an Elder problematizes the production of knowledge about the effects of radiation and the integrity of engineering structures far “outside” any experiential time-space: “I find this a very difficult task to do because within our Indian ways, we are taught that all our decisions should be made by thinking *seven generations in advance*, that when I am here to speak for my family, my thoughts should be projected seven generations in advance” (FEARO 1993: 99). He continues:

we talk about this waste that is going to be here for a very long period of time. We know that the period of time, I believe they talk in terms of half lives, talk in terms of tens of thousands of years. There is a lot of time before that stuff becomes neutralized or becomes harmless again. Now this process that is going to take place is going to take place *over several thousand generations* before this product is harmless again. Is this panel prepared, *or are they capable* of making decisions for that length of time? (FEARO 1993:105, emphasis added).

Members of the SRFN also explicitly ground their claims about the effects of radioactivity both territorially and locally, through epistemic techniques that value knowledge which is embedded in direct experience of a particular landscape. They carefully refer to the practices and places through and in which effects were experienced, explicitly connecting embedded territorial and local watershed experience with knowledge.

Often they explain the extent and embeddedness of their experiences, sometimes in the form of a biography which specifically embeds them in the landscape by recounting the practices such as fishing, hunting, and walking in the watershed, the length of time they lived in the community, or the time they worked in the mines. Describing his time working in the sulphuric acid plant where he marshalled cars of sulphuric acid to the uranium mill sites, one Elder states: "I worked there eight years. Like what I say, I was ah, last one out of there from this reserve in 1963. I remember that because, it really strikes me every New Year's Day that was the day I was laid off. I walked out of there, and they closed it all up. *I seen all that.* Horrible things that I seen with my people" (Elder SRFN, July 27/04, emphasis added). This practice of situating knowledge insists on the importance of the lived local landscape, and is part of the way in which certain kinds of knowledge are privileged by the Serpent River First Nation.

The SRFN's claims privilege place and emphasize the partiality of all experiences and the limits to judgement. Accounts of the effects of NFW also emphasize length and extent of experience, and are valued according to their demonstrated degree of engagement with and embeddedness in place, rather than their imagined separation from it. For example, the historicity of the experience as well as the territorial limits to which they are confined are cast as important to the production of knowledge about NFW:

Our experience is based on *10,000* years of relationship with the land...this land in particular, this watershed in particular [...] You are not a local here. You don't experience any of the perception, you don't experience any of the disadvantages that we've experienced, the negative impacts that we've experienced, the disruption in our

lifestyles that we have experienced. You don't experience any of that" (In FEARO 1993:75, emphasis added).

#### **IV. Concluding Remarks**

The NWMO's scaled representations of the knowledges of Aboriginal peoples, suggest that they have little to no experience of the nuclear fuel chain, have no experience or knowledge of the effects of radioactivity or NFW, and that they have nothing to contribute to understanding the effects of NFW management or the "nature of the hazard" of radioactive waste. The accounts of the SRFN however, reveal the existence of knowledge about radioactivity, and make visible a lived nuclear landscape of which they, as an Aboriginal people, have a disproportionate experience. As one Elder poignantly states, "The impact it had for our people is, is far greater than what happened to ah, the white society. It was. It's a sad thing when you look at it in that respect to see what happened to our people" (Elder SRFN July 27/04). Accounts such as those of the SRFN provide evidence of the existence of nuclear oases (Blowers 1999) where the externalities of the nuclear industry, in this case peripheral geographies of uranium mining, milling and tailings disposal, are concentrated, and who they are concentrated on. The oral histories of the SRFN bring into focus whole dimensions of the nuclear industry carefully kept out of view. Further, in privileging knowledge which is tied to a specific experience of place and rooted in direct lived experience, their accounts implicitly challenge the nuclear industry's apparent ability to transcend the epistemological constraint of space-time to make (optimistic and positive) claims about the nature of radioactive material far into the future.

The discourse of modern risk operates within Canadian NFW management policy making to reconcile the knowledge of the nuclear industry with the outcomes of the NFW management process. I have suggested that modern risk arose as a discursive form in the policy process in anticipation of outsider scrutiny of the nuclear industry's plans for NFW management and that it remains in the NWMO's work as a strategy for normalizing the claims of the nuclear industry about the effects of NFW and its management. Especially since the inscription of Aboriginal peoples onto the official politics of NFW management, the NWMO are concerned with the threats Aboriginal peoples' accounts posed to their knowledge. The experiences of Aboriginal peoples (such as the SRFN) of different parts of the nuclear fuel chain and their implication in its landscapes disrupt the continuity and coherence of the nuclear industry's narratives about the effects of radioactivity and the safe development of nuclear power.

This paper has argued that the discourse of modern risk as used in the work of the NWMO disqualifies the knowledges of Aboriginal peoples and marginalizes

their experiences. It does so by relationally scaling the knowledge of the nuclear industry and of Aboriginal Peoples. The first is represented as universal and concrete knowledge, and the latter as particular; simultaneously local and peripheral. This scaled representation obscures the way in which Aboriginal peoples such as the SRFN are implicated in the geography and political economy of the nuclear industry and thus diminishes the threat created by their experiences and accounts. The discourse allows the NWMO to incorporate Aboriginal peoples and Aboriginal Knowledge into their work in ways consistent with their aims and narratives. I have also suggested that scale is crucial for understanding the ways in which the experiences and knowledges of Aboriginal peoples are marginalized by the discourse of modern risk, as well as more generally the spatiality of normalizing power and discourse.

### **Acknowledgements**

I gratefully acknowledge the helpful comments of Dr. Anna Davies and 2 anonymous reviewers. I would also like to thank Dr. Caroline Desbiens, Dr. Harald Bauder, and Dr. Richard Kuhn, for their comments on earlier versions of this paper, and the organizers of the *2005 Studies in Political Economy Annual Conference: Towards a political Economy of Scale*, where this paper was originally presented. This research was funded by a Social Sciences and Humanities Research Council of Canada Doctoral Research Scholarship, and a Pierre Elliot Trudeau Foundation Doctoral Scholarship.

### **References**

- AECL. Atomic Energy of Canada Limited. 1994. Environmental Impact Statement of the Concept for Disposal of Canada's Nuclear Fuel Waste. Atomic Energy of Canada Limited.
- AECB. R-104. Atomic Energy Control Board. 1986. Regulatory Objectives Requirements and Guidelines for the disposal of Radioactive Wastes-Long Term Aspects. Regulatory Policy R-104.
- AECB. R-71. Atomic Energy Control Board. 1985. Deep Geologic Disposal of Nuclear Fuel Waste: Background information and regulatory requirements regarding the concept assessment phase. Regulatory Policy R-71.
- Aikin, A., James Harrison and Kenneth Hare. 1977. The Management of Canada's Nuclear Wastes. Canadian Government Green Paper on Nuclear

- Waste Management. [EMR Report EP77-6] Energy Mines and Resources: Ottawa
- Alfaro, Laura and Fabio Kanczuk. 2004. Capital controls, risk, and liberalization cycles. *Review of International Economics* 2(3), 412-434.
- Allen, John. 2003. *Lost Geographies of Power*. Oxford: Blackwell.
- Amin, Ash. 2002. Spatialities of globalization. *Environment and Planning A* 34, 385-399.
- Auditor General. 1995. Chapter 3, Federal Radioactive Waste Management. Report of the Auditor General of Canada to the House of Commons, Ottawa, May.
- Barnaby, Johanne. 2003. "Drawing on Aboriginal Wisdom. NWMO Background Paper". <http://www.nwmo.ca>. Accessed 01 June 2003.
- Bauder, Harald. 2006. Chapter 10: Landscape and scale. *Labour Movement: How Migration Regulates Labour Markets*. New York: Oxford University Press.
- Bauder, Harald. 2001. Agency, place, scales: Representations of inner city youth identities. *Tijdschrift voor Economische en Sociale Geografie* 92(3), 279-290.
- Beck, Ulrich. 1992. *Risk Society- Towards a New Modernity*. London: Sage Publications.
- Beck, Ulrich, Anthony Giddens, & Scott Lash. (eds.). 1994. *Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order*. California: Stanford University Press.
- Blowers, Andrew. 1999. Nuclear waste and landscapes of risk. *Landscape Research* 24(3), 241-264.
- Braun, Bruce. 2002. *The Intemperate Rain Forest: Nature, Culture, and Power on Canada's West Coast*. Minneapolis: University of Minnesota Press.
- Bulkley, Harriet. 2001. Governing climate change: The politics of the risk society? *Transactions of the Institute of British Geographers* 26, 430-447.
- Burchell, Graham., Colin Gordon and Peter Miller (eds). 1991. *The Foucault Effect: Studies in Governmentality*. Chicago: University of Chicago Press.
- Cameron, Samuel. 2004. Space, risk, and opportunity: The evolution of paid sex markets. *Urban Studies* 41(9), 1643-1657.

- Canadian Environmental Assessment Agency (CEAA). 1997. Nuclear Fuel Waste Management and Disposal Concept. Transcripts of a Hearing held at the Serpent River First Nation, February 13, 1997. Public Hearings, Phase 3. Toronto: Far and Associates.
- Canadian Environmental Assessment Agency (CEAA). 1998. Report of the Nuclear Fuel Waste Management and Disposal Concept. Ottawa: Canadian Environmental Assessment Agency.
- Capek, Stella. 1993. The "environmental justice" frame: A conceptual discussion and an application. *Social Problems* 40(1), 5-24.
- Carabine, Jean. 2001. Unmarried motherhood 1830-1990: a genealogical analysis. In, Margaret Wetherell, Stephanie Taylor and Simeon Yates (eds.), *Discourse as Data*. London: Sage Publications, pp. 267-310.
- Castel, Robert. 1991. From dangerousness to risk. In, Graham Burchell, Colin Gordon and Peter Miller (eds.), *The Foucault Effect, Studies in Governmentality*. Chicago: University of Chicago Press, pp. 280-299.
- Chambers, Robert and John Quiggin. 2004. Technological and financial approaches to risk management in agriculture: An integrated approach. *Australian Journal of Agricultural and Resource Economics* 48(2), 199-223.
- Commanda, Earl. 1991. Presentation by Chief Earl Commanda on Behalf of the North Shore Tribal Council to the Federal Environmental and Review Panel on the Deep Geologic Disposal of Nuclear Fuel Waste, November 8. Scoping Hearings.
- Cox, Kevin 1998 a. Spaces of dependence, spaces of engagement and the politics of scale, or: Looking for local in politics. *Political Geography* 17(1), 1-23.
- Cox, Kevin 1998 b. Representation and power in the politics of scale. *Political Geography* 17(1), 41-44.
- Crump, Jeff. 2002. Contested landscapes of labour: Rival unionism in the farm implements industry. In, Andrew Herrod and Melissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp. 224-248.
- Cutter, Susan. 1996. Vulnerability to environmental hazards. *Progress in Human Geography* 20(4), 529-539.
- Cutter, Susan. 1995. The Forgotten casualties: Women, children and environmental change. *Global Environmental Change* 5(3):181-194.

- Cutter, Susan, Jerry Mitchell and Michael Scott. 2000. Revealing the vulnerability of people and places: A case study of Georgetown County South California. *Annals of the Association of American Geographers* 90(4), 713-737.
- Defert, Daniel. 1991. 'Popular Life' and insurance technology. In, Graham Burchell, Colin Gordon and Peter Miller (eds.), *The Foucault Effect: Studies in Governmentality*. Chicago: University of Chicago Press, pp. 211-234.
- Dingwall, Robert. 1999. "Risk Society": The cult of theory and the millennium? *Social Policy and Administration* 33(4), 474-491.
- Donzelot, Jaques. 1991. The mobilization of society. In, Graham Burchell, Colin Gordon and Peter Miller (eds.), *The Foucault Effect: Studies in Governmentality*. Chicago: University of Chicago Press, pp. 169-180.
- Dowdeswell, Elizabeth. 2004. "Speech to the Canadian Nuclear Association, Ottawa, February 19". <http://www.nwmo.ca>. Accessed 03 January 2004.
- Dowdeswell, Elizabeth. 2003. "Speech to the Canadian Nuclear Association, Ottawa, March 19". <http://www.nwmo.ca>. Accessed 08 January 2003.
- Eden, Sally. 1998. Environmental issues: Knowledge, uncertainty and the environment. *Progress in Human Geography* 22(3), 425-432.
- Elder, Serpent River First Nation. 5 August 2004. Personal interview.
- Elder, Serpent River First Nation. 27 July 2004. Personal interview.
- Elder, Serpent River First Nation. 22 July 2004. Personal interview.
- Elder, Serpent River First Nation. 21 July 2004. Personal interview.
- Elder, Serpent River First Nation. 7 July 2004. Personal interview.
- Elder, Serpent River First Nation. 6 July 2004. Personal interview.
- Elder, Serpent River First Nation. 16 August 2003. Personal interview.
- Ewald, Francois. 1991. Insurance and risk. In, Graham Burchell, Colin Gordon and Peter Miller (eds.), *The Foucault Effect, Studies in Governmentality*. Chicago: University of Chicago Press, pp.197-201.
- Federal Environmental Assessment and Review Organization (FEARO). 1993. Federal Environmental Assessment Review Panel on the Decommissioning of the Uranium Mine Tailings Management Areas in Elliot Lake, Ontario.

- Transcript of Scoping Sessions held in the Serpent River First Nation.  
Toronto: International Rose Reporting.
- Fothergill, Alice. 1996. Gender, risk, and disaster. *International Journal of Mass Emergencies and Disaster* 14(1), 33-56.
- Foucault, Michel. 1991. Governmentality. In, Graham Burchell, Colin Gordon and Peter Miller (eds.) *The Foucault Effect: Studies in Governmentality*. Chicago: University of Chicago Press, pp. 87-104.
- Foucault, Michel. 1990. *The History of Sexuality*. Volume 1: An introduction. Robert Hurley (trans.). New York: Vintage books/Random House.
- Foucault, Michel. 1976. Two lectures. In, Colin Gordon (ed.), 1980. *Power/Knowledge, Selected Interviews and Other Writings 1972-1977*. New York: Parthenon Books, pp.78-108.
- Fuji- Johnston, Genevieve. 2005. Taking stock: The normative foundations of positivist and non-positivist analysis and ethical implications of the emergent risk society. *Journal of Comparative Policy Analysis* 7(2), 137-153.
- Gibson-Graham, J-K. 2002. Beyond the global vs. local: Economic politics outside the binary frame. In, Andrew Herrod and Mellissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp. 25-60.
- Gordon, Colin. 1991. Governmental rationality: An introduction. In, Graham Burchell, Colin Gordon and Peter Miller (eds.), *The Foucault Effect: Studies in Governmentality*. Chicago: University of Chicago Press, pp. 1-52.
- Green, Steven. 2000. Negotiating with the future: The culture of modern risk in global financial markets. *Environment and Planning D: Society and Space* 18, 77-89.
- Haraway, Donna. 1991. Situated knowledges: The science question in feminism and the privilege of partial perspective. *Simians Cyborgs and Women, the Reinvention of Nature*. New York: Routledge, pp. 183-203.
- Herrod, Andrew and Melissa Wright. (eds). 2002. *Geographies of Power: Placing Scale*. Oxford: Blackwell.
- Hewitt, Ken. 2000. Safe place or catastrophic society? Perspectives on hazards and disasters in Canada. *Canadian Geographer* 44(4), 325-341.
- Hewitt, Ken. 1997. *Regions of Risk*. Singapore: Longman.

- Hier, Sean and Joshua Greenberg. 2002. Constructing a discursive crisis: Risk, problematization and *illegal* Chinese in Canada. *Ethnic and Racial Studies* 25(3), 490-513.
- Hillis, Ken, Michael Pettit and Altha Carvey. 2002. "Adventure travel for the mind": Analyzing the United States virtual trade mission's promotion of globalization through discourse and corporate media strategies. Andrew Herrod & Melissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp. 154-171.
- Jones, Kathrine. 1998. Scale as epistemology. *Political Geography* 17(1), 25-28.
- Kim, Ye-shin, Hoa-sung Park, Jin-yong Kim, Sun-ku Park, Byong-wook Cho, Ig-hwan Sung and Dong-chun Shin. 2004. Health risk assessment for uranium in Korean groundwater. *Journal of Environmental Radioactivity* 77(1), 77-85.
- Kirby, Andrew. 2002. Popular culture, academic discourse, and the incongruities of scale. In, Andrew Herrod and Melissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp.171-191.
- Kurtz, Hilda. 2002. The politics of environmental justice as the politics of scale: St James Parish, Louisiana, and the Shintech siting controversy. In, Andrew Herrod and Melissa Wright. (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp. 249-273.
- Latham, Alan. 2002. Rethorizing the scale of globalization: Topologies, actor networks, and cosmopolitanism. In, Andrew Herrod and Melissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp. 115-144.
- Latour, Bruno. 2003. Is re-modernization occurring- and if so, how to prove it? A commentary on Ulrich Beck. *Theory, Culture & Society* 20(2), 35-48.
- Lietner, Helga, Claire. Pavlik and Eric Shepard. 2002. Networks, governance and the politics of scale: Inter-urban networks and the European Union. In, Andrew Herrod and Melissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp. 274-303.
- Mains, Susan. 2002. Maintaining national identity at the border: Scale, masculinity, and the policing of immigration in Southern California. In, Andrew Herrod and Melissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Blackwell, pp.192-214.

- Massey, Doreen. 2002. Don't let's counter-pose place and space. *Development* 45, 24-25.
- Mawby, C., S. Woodruff, S. Dack and S. Fryer. 2004. A case study of the assessment of pollution-mediated ecosystem effects and risk methodology: The River Ribble Estuary. *Land Contamination and Reclamation* 12(2), 85-97.
- McCann, Eugene. 2002. The urban as an object of study in global cities. In, Andrew Herrod and Melissa Wright (eds.), *Geographies of Power: Placing Scale*. Oxford: Balckwell, pp. 61-84.
- McHoul, Alex and Wendy Grace. 1993. *A Foucault Primer: Discourse, Power and the Subject*. Melbourne: Melbourne University Press.
- Moon, Graham. 2000. Risk and protection: The discourse of confinement in contemporary mental health policy. *Health and Place* 6, 239-250.
- Murphy, Brenda. and Richard Kuhn. 2001. Setting the terms of reference in environmental assessments: Canadian nuclear fuel waste management. *Canadian Public Policy* XXVII(3), 249-266.
- Nuclear Fuel Waste Management Organization (NWMO) 2005 a. Choosing A Way Forward: The Future Management of Used Nuclear fuel, Draft Study Report. Toronto: NWMO.
- Nuclear Fuel Waste Management Organization (NWMO). 2005b. Choosing A Way Forward: The Future Management of Used Nuclear Fuel, Final Study. Toronto: NWMO.
- Nuclear Fuel Waste Management Organization (NWMO). 2004a. Understanding the Choices: the Future Management of Canada's Used Nuclear Fuel. Toronto: NWMO.
- Nuclear Fuel Waste Management Organization (NWMO) 2004 b. Citizen Dialogues, NWMO Backgrounder, August 6. Toronto: NWMO.
- Nuclear Fuel Waste Management Organization (NWMO). 2004 c. From Dialogue to Decision: Managing Canada's Nuclear Fuel Waste, Annual Report 2003. Toronto: NWMO.
- Nuclear Fuel Waste Management Organization (NWMO). 2003a. Asking the Right Questions? The Future Management of Canada's Used Nuclear Fuel. Toronto: NWMO.

- Nuclear Fuel Waste Management Organization (NWMO). 2003b. Approach to the Development of an Analytical Framework. Planning Document, July 2003. Toronto: NWMO.
- Nuclear Fuel Waste Management Organization (NWMO). 2003c. NWMO News, November Issue Volume 1:2. Toronto: NWMO.
- Natural Resources Canada (NRCan). 1996. Policy Framework for Radioactive Waste. Government of Canada: Ottawa.
- Nuclear Fuel Waste Management Act. Statute of Canada 49-50-51. Nov 15, 2002. Sc. 49-50-51.
- Oels, Angela. 2005. Rendering climate change governable: From biopower to advanced liberal government? *Journal of Environmental Policy and Planning* 7(3), 185-207.
- Peters, J. and M. Fearn-Duffy. 2000. Nuclear Waste Management: Aboriginal Perspectives on Long-Term Waste Management. Toronto: Ontario Power Generation.
- Pratt, Geraldine. 1999. Geographies of identity and difference: Marking boundaries. In, Doreen Massey, John Allen and Philip Sarre (eds.), *Human Geography Today*. Cambridge: Polity Press in Association with Blackwell, pp.151-168.
- Raco, Mike. 2002. Risk, fear and control: Deconstructing the discourses of New Labour's economic policy. *Space and Polity* 6(1), 25-47.
- Reckmans, Loraine, Keith Lewis and Andrew Dwyer. (eds). 2003. *This Is My Homeland- Stories of The Effects of Nuclear Industries by People of the Serpent River First Nation and the North Shore of Lake Huron*. Serpent River First Nation: Anishnabe Printing.
- Rose, Gillian. 1999. Performing space. In, Dorene. Massey, John. Allen and Philip Sarre (eds.), *Human Geography Today*. Cambridge: Polity Press in Association with Blackwell, pp. 247-259
- Serpent River First Nation (SRFN). 1979. Presentation by the Serpent River Indian Band to the Environmental Assessment Board Regarding the Uranium Mine Expansion in the Elliot Lake Area, Elliot Lake, Ontario, January 9.
- Serpent River First Nation (SRFN). 1978. Statement by the Serpent River Indian Band to the Environmental Assessment Board Considering the Proposed Elliot Lake Mines Expansion, Eliot Lake, Ontario, September 20.

- Serpent River First Nation (SRFN). 1977. Submission by the Serpent River Indian Band to the Environmental Assessment Board Regarding the Uranium Mine Expansion in the Elliot Lake Area, Elliot Lake, Ontario, August.
- Schlosberg, David. 1999. Networks and mobile arrangements: Organizational innovation in the US environmental justice movement. *Environmental Politics* 8(1),122-148.
- Sibley, David. 1999. Creating geographies of difference. In, Doreen Massey, John Allen, and Philip Sarre (eds.), *Human Geography Today*. Cambridge: Polity Press in Association with Blackwell, pp.115-128.
- Sibley, David. 1995. *Geographies of Exclusion, Society and Difference in the West*. London: Routledge.
- Smith, Neil. 1992. Contours of a spatialized politics: Homeless vehicles and the production of geographical scale. *Social Text* Volume Unknown(33), 54-81
- Smith, Susan. 1999. The cultural politics of difference. In, Doreen Massey, John Allen and Philip Sarre (eds.), *Human Geography Today*. Cambridge: Polity Press in Association with Blackwell, pp.129-150.
- Stanley, Anna. 2004. Summary and Analysis of the Testimonies and Submissions of Aboriginal Peoples and Nations to the Public Environmental Assessment Panel on the Concept of Deep Geologic Disposal in the Canadian Shield. Report Prepared for the Assembly of First Nations, June. Available from the Assembly of First Nations.
- Towers, Gregory. 2000. Applying the political geography of scale: Grassroots strategies and environmental justice. *Professional Geographer* 52(1), 23-36.
- Wilson, David and Harald Bauder. 2001. Discourses and the making of marginalized people: Introduction to special issue. *Tijdschrift voor Economische en Sociale Geografi*. 92(3), 259-256.
- Wu, Felicia. 2004. Mycotoxin risk assessment for the purpose of setting international regulatory standards. *Environmental Science and Technology* 38(15), 4049-4055
- Wu, Hong and Donald Wilhite. 2004. An operational agricultural drought risk assessment model for Nebraska, USA. *Natural- Hazards* 33(1),1-21.
- Young, Iris Marion. 1990. *Justice and the Politics of Difference*. New Jersey: Princeton University Press.