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# Confronting risk: A case study of Aboriginal peoples' participation in environmental governance of uranium mining, Saskatchewan

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*While the number of non-regulatory environmental governance arrangements overseeing mining has been growing in Canada, there remains limited research critically examining Aboriginal peoples' experiences in these emerging institutions. This is especially notable with respect to the sharing of techno-scientific information, often used as a means of enabling Aboriginal peoples' participation and engendering their trust. A qualitative case study of the Northern Saskatchewan Environmental Quality Committee oversight of uranium mining, this research explores how techno-scientific information in the form of risk assessments was socially constructed and discursively employed by government and industry, and how Aboriginal participants responded. Findings illustrate that risk assessments were presented in ways that rendered development as controllable and inevitable, which facilitated dominant political economic agendas and capitalist practices. Aboriginal participants, however, introduced alternative interpretations of risk and sought to claim spaces within this governance institution through underscoring absent uncertainties, and asserting knowledges of global technological failures and local conditions that contradicted scientific reassurances. Aboriginal participants also highlighted the social injustices of development processes in Saskatchewan's north, which shaped their interpretations of risk, raising important questions about the value of these alternative governance institutions for Aboriginal peoples and their environments.*

Keywords: risk, environmental governance, uranium mining, Indigenous peoples

**Le périmètre circonscrit du risque et de l'engagement dans le nord : une étude de cas sur la participation des populations autochtones dans la gouvernance environnementale de l'extraction de l'uranium en Saskatchewan**

*Bien que le nombre de dispositions de gouvernance environnementale non-réglementaires en matière de surveillance de l'extraction minière ait augmenté au Canada, peu de recherches se sont intéressées de manière critique aux expériences des populations autochtones au sein de ces instances nouvellement établies. Ceci est particulièrement évident en ce qui concerne le partage de renseignements technoscientifiques qui sont couramment utilisés pour créer un cadre propice à la participation des populations autochtones et gagner leur confiance. Une étude de cas qualitative portant sur le Comité de qualité environnementale du nord de la Saskatchewan, qui est chargé de surveiller l'extraction d'uranium, est menée dans le but de montrer en quoi des renseignements technoscientifiques qui renvoient à des évaluations du risque ont été socialement construits et intégrés dans le cadre discursif du gouvernement et de l'industrie. Cette recherche vise également à comprendre les réactions des participants autochtones. Les résultats ont révélé que la présentation de ces évaluations du risque repose sur l'idée que le développement est contrôlable et inévitable, de sorte que les orientations dominantes en matière économique et politique ainsi que les pratiques capitalistes soient maintenues. Des participants autochtones ont proposé néanmoins des interprétations alternatives relatives au risque et ont tenté de revendiquer des espaces au sein même de cette instance de gouvernance en soulignant*

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*des incertitudes manquantes dans les évaluations et en faisant état de connaissances concernant les échecs technologiques au niveau mondial et des conditions du milieu local, en porte-à-faux avec les affirmations scientifiques. Des participants autochtones ont aussi mis en évidence les injustices sociales qui découlent des processus de développement en cours dans le nord de la Saskatchewan et sur lesquelles reposent leurs interprétations à l'égard du risque. Ils ont ainsi soulevé des questions importantes quant à la valeur que ces instances de gouvernance alternatives peuvent apporter aux populations autochtones et à leurs milieux de vie.*

Mots clés : risque, gouvernance environnementale, extraction de l'uranium, populations autochtones

## Introduction

With environmental problems as a defining feature of our time, efforts at addressing these problems are subject to ongoing debate, challenge, and experimentation. In response to the failures and limitations[1] of centralized, top-down approaches to environmental management, innovative environmental governance arrangements have emerged in the last 20–30 years. For the purposes of this article, environmental governance refers to the formal and informal arrangements and mechanisms through which diverse actors can participate to shape environmental actions and outcomes; this includes citizens, communities, industry, social movements, NGOs, and the state (adapted from Lemos and Agrawal 2006).

Environmental governance represents a more progressive approach to environmental management as it rests on democratic principles of inclusion and participation from diverse societal groups and sectors. This is particularly relevant for Indigenous peoples and their participation in environmental governance, given their knowledges of and dependence upon local environments, and also their historically marginalized positions in colonial settler societies. These factors speak to important contributions that Indigenous peoples can make to our understanding of local environmental changes, as well as social justice issues that have the potential to be (at least partially) redressed through their participation in environmental governance institutions.

There remains, however, limited research critically examining Aboriginal peoples' experiences, participation, and power in emerging forms of non-regulatory[2] environmental governance arrangements overseeing mining operations in Canada. These include environmental agencies, boards, and committees that comprise a combination of government, industry, and Aboriginal representatives who inform decision-makers on environmental management practices and policies. This is an important knowledge gap given that approximately 1,200 Aboriginal communities sit within 200 km of active mines, and 36 percent of First Nations communities are situated within 50 km of a mine site in Canada (Hipwell et al. 2002). In addition, given the Canadian government's recent streamlining of environmental assessment by limiting public participation as well as the number and length of environmental reviews required through the Canadian Environmental Assessment Act of 2012, these non-regulatory arrangements may become more critical spaces for Aboriginal voices.

These alternative, non-regulatory arrangements have emerged relatively recently in Canada (i.e., within the last 10–20 years). In some cases environmental boards and agencies develop out of Impact Benefit Agreements or IBAs; IBAs are voluntary, legal contracts between industry and Aboriginal groups that cover economic, socio-cultural, and environmental issues. Fitzpatrick (2007) views these alternative governance structures as progressive and indicative of a new staples economy that responds to a diverse range of actors involved in policy processes. One important focus of scholarly attention has been in assessing and highlighting the content value of IBAs as an additional form of environmental security for communities beyond environmental assessment plans, or prior to environmental

[1] Problems with top-down approaches to environmental management include lack of effectiveness, undemocratic processes, and public distrust (Bulkeley and Mol 2003).

[2] As these are non-regulatory arrangements being referred to in this article, they do not include environmental assessments or Canadian Nuclear Safety Commission hearings which are not arrangements specifically targeted at Aboriginal peoples' involvement.

assessments commencing (Hipwell et al. 2002; O'Faircheallaigh and Corbett 2005; O'Faircheallaigh 2006, 2007; Galbraith et al. 2007; Fidler and Hitch 2007, 2010). Fidler and Hitch (2007) claim that IBAs may also serve to accommodate the cultural and spiritual connections Aboriginal peoples have with the land where environmental assessments do not.

Critiques of of IBAs, however, have pointed out that negotiations often occur within limited timeframes that don't allow communities to absorb project information, seek expertise, and/or make an informed decision (Sosa and Keenan 2001). Caine and Krogman (2010) note that many Aboriginal social justice issues are not identified through IBAs, including the unfettered pace of industrial development, and the uneven power dynamics inherent in IBA negotiations that shape resulting agreements. Hall (2013) is also critical of alternative governance institutions in the North based on her incisive review of the political economic contexts in which they're situated, and she concludes that they serve to disempower Aboriginal peoples. More specifically, O'Faircheallaigh's (2006, 2007) and O'Faircheallaigh and Corbett's (2005) research examined environmental governance structures overseeing mining operations in the NorthWest Territories and Labrador by assessing their potential to facilitate Aboriginal participation. Overall, it was concluded that these structures did not demonstrate how Aboriginal participation was facilitated through the flow of technical environmental information; even though there was access to information, this did not mean Aboriginal peoples were enabled to understand that information in order to question it, challenge it, and/or support it.

Their findings are important in describing the limited value of information availability within these governance institutions, but there is room for extended interrogation of knowledge politics. This includes the need to question the assumed truth-value and inherent dominance of the knowledge and information which is circulated.[3] In addition, the "experts" are rendered invisible; that is, those responsible for assessing, assembling, and disseminating the techno-scientific information to Aboriginal participants.[4] It is also not evident how these experts were perceived by Aboriginal participants. Finally, techno-scientific information is embedded within, and cannot be disentangled from, broader capitalist colonial projects. In response to existing research gaps in understanding Aboriginal peoples' experiences with these alternative governance institutions overseeing mining, and calls for greater scholarly attention towards the power dynamics within IBAs and governance institutions (Caine and Krogman 2010; Hall 2013), this study explores Aboriginal peoples' participation through a theoretical approach that underscores knowledge politics, power relations, and the social and political context of industrial development. This study also emphasizes ways in which Aboriginal participants are resisting dominant discourses circulating within these institutions.

This research employs the example of an environmental governance institution overseeing a series of uranium mines in Northern Saskatchewan. Uranium mining provides a particularly apposite case to explore the dynamic between the administration of, and Aboriginal participants' responses to, techno-scientific information given that it presents radiological and chemical toxic risks that are considered especially pervasive and menacing, and that the nuclear industry in Canada is committed to risk communication as a means of allaying fears and gaining the trust and support of local communities and the public for nuclear development. While communication of techno-scientific information is a principal means for building trust and improving social relations, this communication is based upon risk as a dominant organizing framework and discourse. As such, this article shall both critically consider the construction of risk and its employment as a discourse, and explore how social relations and social and economic contexts shape Aboriginal participants' responses to techno-scientific

[3] O'Faircheallaigh does state, however, that the "Conventional discourse on environmental management can be obscure to many Indigenous people both because they do not understand the teminology it employs and, more fundamentally, because they do not comprehend or accept its assumptions" (2007, 324).

[4] Noble and Birk's (2011) research went beyond the information transfer governance model and explored a case of Aboriginal peoples' direct involvement in the collection of environmental monitoring data surrounding uranium mine sites. The authors found that environmental data collected was not scientifically credible because of the limited sample sizes industry and consultants instructed community members to take. Even this model is thereby questionable in facilitating Aboriginal participation.

information and constructions of risk. This study therefore addresses the following questions:

- How is risk constructed and techno–scientific information framed by industry and government representatives?
- How is risk interpreted and techno–scientific information received by Aboriginal participants in the Northern Saskatchewan Environmental Quality Committee (NSEQC)?
- How does the social, political, and economic context shape constructions and interpretations of risk and techno–scientific information within the NSEQC?

This article is organized by first introducing the theoretical framework on the social construction of risk, trust, and dissemination of techno–scientific information in the context of techno–industrial hazards. Following this, an overview of uranium mining and Aboriginal peoples in Saskatchewan is detailed, which leads into a description of the case study and methods employed for this study. The dynamic between policy statements, communication of techno–scientific information, and the responses of Aboriginal representatives positioned within the NSEQC governance space is then related. The article concludes by summarizing findings in relation to the theoretical framework, and discussing avenues for future research.

## Deconstructing and problematizing "risk"

The concept of risk is central to any understanding of community engagements with uranium mining and techno–industrial risks, and understanding risk as a social construct cannot be discussed without first turning to Ulrich Beck's risk society thesis. Beck (1992) speaks to the pervasiveness of techno–industrial risks as an inherent feature of the modern world from which no one is immune, such as global warming and nuclear radiation. Another important argument in Beck's thesis is that the "scientization" of risk has become big business: as science makes the prediction of potential consequences from techno–industrial risks possible, citizens become aware of, and dependent upon, the identification of techno–industrial risks through the production of scientific knowledge. This elevates the expertise and status of scientific professions in the discourse of risk. At the same time, however, science places itself in a difficult and contradictory position by being the creator, assessor, *and* solution provider of the risks we face. This has led to increased reflexivity about, and distrust of, science on the part of citizens. Though scientific knowledge is not entirely dismissed, doors are opened to alternative knowledge claims and socio–political interests, and citizens must then choose between different experts to determine who to trust.

One of the major criticisms of Beck's risk society thesis, however, is that he fails to take it further and engage in deconstructing the nature of knowledge presented by different experts that citizens must choose between; this includes deconstructing the socio–cultural basis of expert knowledge, and how it interacts with citizens' own understandings, values, and experiences (Wynne 1992, 1996; Fischer 2000). Technical understandings of risk are rooted in cultural biases of scientific knowledge that often go unacknowledged by scientists and policy makers when it comes to the definition and framing of risk with public policy issues (Leach et al. 2005). The conventional definition of risk communication restricts it to how experts need to inform others about the "truth"; this assumes lay people hold on to false beliefs, and need to be educated to think about risk more objectively and conform to scientific rationality (Plough and Krimsky 1987; Jasanoff 1998).

This conception of risk doesn't necessarily sit well with citizens on the receiving end of it, and problematises the non–scientist rather than the scientists and affiliated institutions. Plough and Krimsky (1987) refer to "cultural rationality" where risk is understood by citizens in terms of the context in which risk is identified; their social and cultural values; and threats to family, community, and place. In a low–trust society, cultural rationality leads to skepticism and sociocultural experiences are strongly factored into interpretations of technical forms of risk (Fischer 2000). Citizens become extremely wary of the potential for misleading communications based on unequal relationships of power with industrial agents (Fischer 2000, 2005), and institutional self–interests, values, and commitments that technical knowledges and scientific statements can embody, as when science is used for the legitimation of industrial practices (Irwin et al. 1996; Irwin and Wynne 1996). Citizens then

turn to their social experiences with industry, considering how they've been treated and related to in the past, whether there might be a hidden agenda, and how industry engages with them (Fischer 2005).

Finally, and most importantly, conceptualizations of risk can be extended—with risk understood as a discourse that serves to channel power in society. This is evident with the framing of environmental problems primarily in terms of risk (i.e., the dominant discourse), as well as the analytical techniques used to assess risk that restrict other ways of thinking and talking about harms to human beings and environment (Jasanoff 1998, 1999). With risk as a discourse, reality is determined as the controllable consequences of technologies, which also renders them justifiable (Wynne 2002). Quantitative risk assessment frames the world so that users of the discourse are alerted to certain features but desensitized to others (Jasanoff 1998). Left out of this discourse is the social construction of uncertainties in relation to technological developments, including exposure of which techniques used to measure uncertainty become labeled as reliable; how uncertainty is characterized; and the resources applied to its reduction (Jasanoff 1998). Other erasures from discourses of risk include: the role of human agency and social processes as sources of risk; the different ways these technologies might be understood, including meanings assigned to them that defy quantitative assessment (Jasanoff 1998); and questions about whether these technological developments should even exist. The risk-based discourse thereby renders other imaginaries, alternatives, and meanings of technology as non-existent for democratic consideration. The discourse of risk comes to define the full sphere of meaning for technological developments, which is revealed through scientific language and methods (Wynne 2002), and the people or institutions that master the risk-based discourses to the exclusion of other valid, but less powerful perspectives (Jasanoff 1998).

Most recently, critical geographers have linked the discourse of risk to the sustainability of capitalist political economies, the unloading of harmful effects of accumulation, and governance structures (Baldwin and Stanley 2013; Stanley 2013). Drawing from Foucault, Stanley (2006, 2013) describes risk as a form of knowledge production that becomes naturalized, normalized, and prioritized in environmental management, and which facilitates the viability of the nuclear industry in Canada. Risk thereby serves to consolidate and support certain political economic power structures at the expense of Aboriginal peoples who are disproportionately exposed to its negative environmental impacts, producing a racialized Canadian geographical landscape (Stanley 2006, 2013). Uranium mining represents an industrial development bounded by the language of risk; unpacking constructions of risk, and the social, economic, and political contexts in which they are situated is paramount to any critical understanding of the power-laden contours of techno-scientific information. This is particularly imperative when considering the position of a large number of Aboriginal communities in Northern Saskatchewan that are surrounded by multiple radiological hazards, and participate in an environmental governance institution that relies on the construct of risk to analyze and communicate those hazards. The following section provides a detailed account of the relationship between uranium mining and Aboriginal communities in Saskatchewan, the evolution of the NSEQC, how it functions as an environmental governance institution, and the positioning of Aboriginal participants within it.

## Aboriginal communities, uranium mining and the NSEQC in Northern Saskatchewan

Saskatchewan's north is technically defined as the Northern Administration District; this region contains approximately half the province's land area, but only 37,000 people or 3.5 percent of the province's population, of which approximately 80 percent are of Aboriginal heritage (Government of Saskatchewan, Bureau of Statistics 2012; Government of Saskatchewan, First Nations and Métis Relations 2012a). The northern region is also exceptionally rich in natural resources such as uranium, where Saskatchewan stands as the world's second largest producer, producing approximately 17 percent of the world's total supply (World Nuclear Association 2012a). Most of the land and all the mineral rights in the northern region are owned by the Crown. From 1980 through 2011, over $8 billion was invested in mineral exploration in Saskatchewan (Saskatchewan Mining Association 2012). This reflects a recent "nuclear

renaissance" tied to global warming and the search for alternative energy sources, as well as the prospects for economic development of nation states with rising global uranium prices (Hecht 2006).

Environmental impacts from uranium mining continue to pose unique challenges for regulators. Unlike other mining operations where there is chemical toxicity, uranium mining presents both chemical and radiological toxicity. The radionuclides of concern include uranium, radium, radon, and polonium. Other potentially harmful contaminants include arsenic, lead, nickel, molybdenum, and selenium. Some of the most important environment and health studies in Northern Saskatchewan have been conducted in the area surrounding the former operating mines of Gunnar, Lorado, and Beaverlodge, which are currently in the process of being decommissioned (Figure 1). The lake near "Beaverlodge is forecast to be contaminated with uranium for possibly hundreds of years" (public health representative, December 2010 NSEQC meeting). In the late 1980s a study of Langley Bay, in proximity to the Gunnar and Lorado mine sites, revealed high concentrations of radionuclides in whitefish populations (Waite et al. 1988). A health advisory is currently in place that proscribes no fishing, swimming, or drinking of untreated water out of Langley Bay. In the late 1990s, concentrations of uranium, radium, lead, polonium, and a fission product from fallout were measured in tissues from 18 Wollaston Lake caribou (Figure 1). The doses and risks for people consuming Wollaston caribou, however, were considered low (Thomas and Gates 1999). Another study showed that hatching success of minnow embryos exposed to waters receiving contaminants from Key Lake and Rabbit Lake mines (see Figure 1) was reduced by 32–61% (Pyle et al. 2002). Selenium concentrations in aquatic biota near the Mclean Lake mine (Figure 1) were found to be elevated, but not of concern (Muscatello and Janz 2009). Most recently, a study of Key Lake Mine uranium waste rock piles suggested the potential for long-term surface and groundwater contamination as uranium and nickel could migrate to the water table below the waste rock pile (Singh and Hendry 2013). Based on some of these studies, there is therefore an indication of scientific concern regarding the environmental impacts from uranium mining, particularly over the long term, though human health studies remain limited.[5] With the exception of Waite et al. (1988), and Thomas and Gates (1999), these studies were not presented at the NSEQC meetings during the period in which this research was conducted.

Uranium mine operations are governed by myriad federal and provincial regulations, and the uranium mining industry is the only one in Canada licensed, regulated, and monitored by the federal government through the Canadian Nuclear Safety Commission (CNSC). In the early 1980s the Saskatchewan provincial government introduced a comprehensive environmental assessment and regulatory/enforcement program to deal with the environmental and human health concerns associated with uranium development. Environmental Impact Statements must include a project description; baseline environmental data; predicted physical, biological, socioeconomic, and community impacts of the proposed project; and assessment of the potential for negative cumulative environmental effects. There must also be plans for decommissioning and reclamation of mine sites (Government of Saskatchewan 2006). A provincial Cumulative Effects Monitoring program to measure the impacts of multiple uranium mines on the environment ended in 2008, though it may yet be reinstated.

Currently nine uranium mines are in various stages of development in Northern Saskatchewan. The companies responsible for these mines are Cameco, a Canadian company producing 14 percent of the world's uranium, and Areva, a French company involved in all stages of the nuclear fuel cycle and the world's second largest uranium producer (World Nuclear Association 2012a). Thirty-two northern municipal and Aboriginal communities covering a large swath of Northern Saskatchewan have been identified as impacted by uranium mining (Figure 1) (Government of Saskatchewan, First Nations and Métis Relations 2012b). Aboriginal peoples in Northern Saskatchewan comprise primarily the Cree, Dene, and Métis; uranium mining and milling has been the largest single source

[5] Though a study by the Canadian Nuclear Safety Commission showed proportionate increases in lung cancer risk with increasing radon exposure among individuals who worked at the former Beaverlodge mine some time between 1930 and 1982 (Canadian Nuclear Safety Commission, year not provided); this mine operated prior to tighter regulations and improved technologies being introduced to control and monitor radon gas exposure.

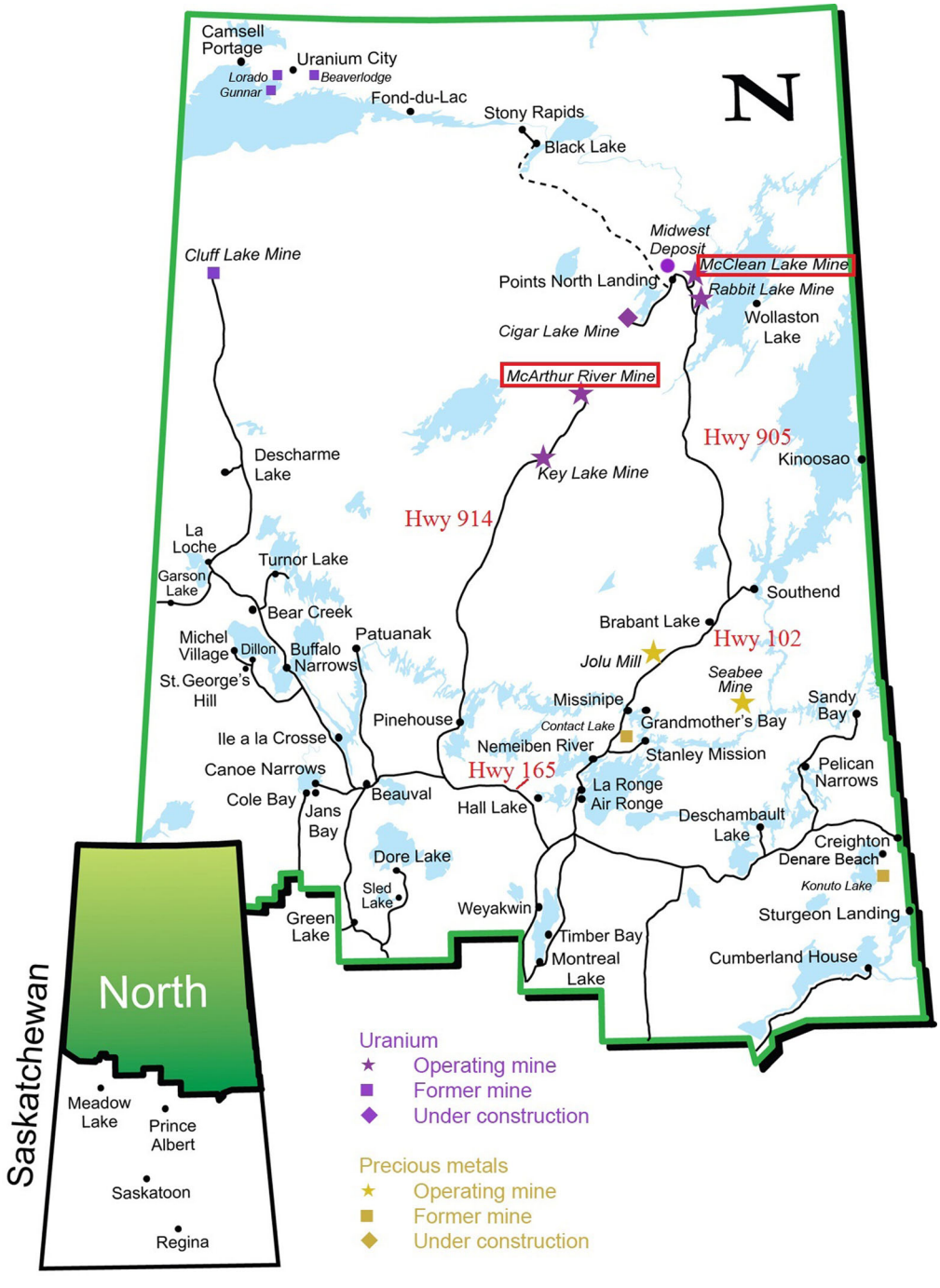


**Figure 1**
Location of Northern Saskatchewan uranium mines and communities
SOURCE: Adapted from Government of Saskatchewan, First Nations and Métis Relations

of employment and economic opportunity in Northern Saskatchewan since the 1950s, while traditional trapping, fishing, and hunting activities have diminished (Parsons and Barsi 2001).

Since 1991 all proposals for new uranium mines and mills have been referred to the Joint Federal–Provincial Panel on Uranium Mining Developments in Northern Saskatchewan for public review. This review was meant to address the health, safety, environmental, and economic impacts of uranium, and to provide opportunities for full public consultation and review, particularly from northern communities and Aboriginal peoples. The review was partly a response to resistance to uranium mining in some northern communities during the mid–1980s, including protests and blockades at Wollaston Lake by the Lac La Hache Band (Goldstick 1987).

The consultations for the Joint Federal–Provincial Panel revealed that many northerners wanted to receive greater economic benefits from mining. As a result, companies made long–term commitments to maximize the recruitment, hiring, and training of northerners (Parsons and Barsi 2001). Northerners also sought increased participation in environmental management of mining, with significant concerns for the long–term health of the land and the protection of future generations from the environmental impacts of development. A result of this was the formation of the NSEQC in 1995. The NSEQC consists of representatives from both federal and provincial government agencies, industry, and northern communities, with approximately 85 percent of community representatives being Aboriginal. The committee has no regulatory responsibilities, with its "…function primarily to receive, evaluate and transmit information and recommendations… to exert influence on the way in which development occurs" (Northern Mines and Monitoring Secretariat 2010, 3).

The purpose of the NSEQC is to help bridge the information gap between northern communities, government, and the uranium mining industry to ensure mining is managed in an environmentally responsible manner. The Northern Mines Monitoring Secretariat (NMMS) was created by the Saskatchewan government to provide the NSEQC access to information about mines; the NMMS is, therefore, responsible for gathering data and reports on the environment, worker health and safety, and socio–economic monitoring, and providing this to the NSEQC (Northern Mines and Monitoring Secretariat 2010). There are a total of 32 primary representatives from communities, who are required to participate in the three or four regional meetings each year, which last almost two days. At these meetings, various types of information are provided, including mine site status updates by industry, reportable spills, construction projects, employee numbers, environmental management practices, provincial environmental policies, environmental assessment updates, industry donations, industry scholarships, and training opportunities for northerners. There may also be speakers from the Provincial Ministry of the Environment, other provincial government ministries, and the Canadian Nuclear Safety Commission. During the last two hours of each meeting, community representatives participate in a roundtable where they have the opportunity to provide feedback about the meeting in the absence of industry or government representatives (with the exception of the NMMS secretariat). There are a wide range of issues discussed at these meetings, including environmental risk assessments; the decomissioning process for the Gunnar and Lorado mines; the structure, value, and power of the NSEQC; the distribution of costs and benefits with mine development; consultation and exploration; employment opportunities and challenges for northerners; ore transport; and human health concerns. The more contentious issues often have to do with representative frustrations at the lack of, or limited, consultation around exploration activities; uncertainty with environmental risk assessments; racism experienced at mining camps; lack of job opportunities for northerners in mining; and the limited information sources available to them at these meetings. There is a fairly even mixture of some very long term, consistent representation, for example those who have been there since the inception of the NSEQC; representatives who have been involved for the last five years; and also recent turnover (i.e., representatives participating within the last one to two years). In addition, there are representatives who either formerly or currently work in the uranium mine industry, others who have worked as environmental consultants, and some who have had only a very limited connection to the industry in terms of direct employment.

The author undertook a case study of the NSEQC from December 2010 to June 2012. This entailed the collection of six sets of meeting minutes and participant observation of five NSEQC meetings

totaling 75 hours. The author also collected and analyzed three sets of policy documents, and participated in a tour of the Cigar Lake uranium mine with NSEQC representatives in August 2011. While meeting minutes allowed for analysis of verbal exchanges, questions, and comments among participants, participant observation was important for identifying the verbal tone, facial expressions, and emotions of participants that enabled a more accurate interpretation of verbal exchanges. In addition, participant observation allowed the author to gain the trust of participants, which was particularly important for being able to engage with them in "off-stage" conversations during breaks and the lunch hour; these off-stage conversations were valuable in terms of revealing concerns that Aboriginal participants had which they did not feel comfortable voicing in the meetings. The meeting minutes were recorded by a government representative, and supplemented with the author's own notes recorded during the meeting. A focus group facilitated by the author with 14 Aboriginal representatives was also conducted. This involved asking participants specific questions related to the research questions and guiding theory in order to 1) triangulate and validate the meeting minutes and participation observation notes; 2) allow for more focused questions to be asked that were not addressed through the other research methods, and 3) provide an opportunity for Aboriginal representatives who may not have been participating in the larger meeting to have some input. The focus group was also an opening for other issues to emerge outside of the official governance space. The focus group was video recorded and transcribed by the author. Initial themes were identified based on the research questions and guiding theory. Both the meeting minutes and focus group were imported into the NVivo qualitative software package where further themes were identified based on what emerged from the text. The results of this analysis are conveyed in the following section.

## Confronting "risk" in the Northern Saskatchewan Environmental Quality Committee

The NSEQC is premised on the circulation of environmental and techno-scientific information to enable northern community participation; its *raison d'être* rests on the view that the proper communication of risk, and the provision of information to community representatives will beget their trust, and thereby support of uranium mining. In one government document it states that the NSEQC "…will deal with issues such as…addressing the potential issue of mistrust of mining companies and government regulators" (Northern Mines Monitoring Secretariat 2010, 9). This document further states that one of the main roles of the NSEQC representatives is to "…help increase the awareness and understanding of northerners regarding…monitoring activities surrounding the uranium industry" and "the role of government and industry in protecting the environment…" (Northern Mines Monitoring Secretariat 2010, 12). The aim of enabling understanding of how safe uranium mining is, and the trust that should be vested in mining companies and regulators, manifests through a number of direct and indirect statements within official NSEQC-related documents[6] such as,

> One of the first challenges was, and continues to be, to raise the northern public's level of understanding of technical issues related to uranium mining and associated environmental protection and regulation measures…The possibility of contamination, no matter how remote, is a very real concern to the people of the north. Understandably, northerners need to decide for themselves, based on information which they trust, whether or not uranium mining is affecting their foodstuffs or living environment. (Government of Saskatchewan, Saskatchewan Northern Affairs 1999, 9)

The entrenched belief is that uninformed or misinformed representatives need to be educated about the actual environmental risks of uranium mining and how these risks are being soundly managed, so that they will have faith in development actors and support uranium development.

However, being informed did not necessarily equate to acceptance and support for particular projects in the uranium industry on the part of NSEQC representatives. For a time, the transport of ore slurry from the McCarthur River Mine to the McClean Lake Mill became one of the more contentious issues within the NSEQC. This slurry was to be processed into uranium concentrate or "yellowcake"

[6] See also Goulet (1997).

at the McClean Lake Mill in order to restart the mill and prepare it to process ore from the Cigar Lake Mine which would be delivering slurry in a year's time, and thereby reduce production delays. The hauling of slurry was to be done on a very long series of public highways totaling 950 km in length that included Highways 914, 165, 102, 905 (Areva 2012); though McArthur and McClean Lake are relatively close to each other, there is actually no road access between them (Figure 1). Approximately 14,000 cubic metres of uranium ore slurry would be transported annually for up to three years (Areva 2011a), "entailing a maximum of two full trucks and two empty trucks a day, 300 days a year" (industry representative, March 29, 2011 NSEQC meeting).

NSEQC participants had apprehensions about this plan given their familiarity with the poor road conditions in Northern Saskatchewan where there are one-lane highways that make it dangerous to pass, people who drive at high speeds, and slippery winter conditions for much of the year. Some NSEQC representatives had particular concerns about the possibility of truck accidents and slurry spills at river crossings, and these concerns were not isolated to representatives who lived along the ore haul route. It was often noted by representatives that bodies of water were not contained, with waterways and currents flowing across large distances and through more remote communities. Representatives were concerned about the difficulties of containing and limiting the impacts of such a spill given how quickly some of the river water moves (particularly during spring run-off), its importance for fish habitat, and as a source of drinking water for Aboriginal communities and the animals they consume.

Industry representatives pointed out their adherence to Transport Canada regulations, with slurry being carried in IP-2 compliant containers designed not to leak and to be tipped over or dropped and still retain their integrity; there are also 16 mm liners on the containers, and drivers require higher standards of qualification. They explained that as part of the Environmental Impact Statement required by both the CNSC and the province, the company had predicted spill scenarios and designed emergency response/management interventions. First, an industry representative emphasized that the risk of a container falling off of a truck and spilling its contents into a river is low given that they are bolted down and tested. The industry representative then described a scenario the company put together, where it is assumed that two containers flip into a river and open up, and the slurry moves out in ten minutes. They determined that there would be no long-term environmental effects to habitat, fish, wildlife, or communities living downstream, and it would not cause an acutely toxic situation (March 29, 2011 NSEQC Meeting). NSEQC representatives were not convinced by this information, however, as this representative exclaimed:

> Is there experience anywhere in the world with a spill of slurry or yellowcake? They mentioned the ship from Vancouver. These are rough roads—you keep emphasizing that the containers won't break, but too many times you're proven wrong; 1/17000 years chance of a spill, but what's happening in Japan right now? I wonder what they were telling their people. Man can't really predict—it can't be guaranteed, ever.

This representative's response indicates that risk assessments are perceived as unreliable, and can simply be wrong, based on abstract models that don't reflect real world conditions. She views the science of risk assessment as both limited and problematic. This is made more evident to the representative by two recent high profile incidents. The first involved 12 containers of yellowcake being spilled on a ship from Vancouver to China, and the other being the earthquake and tsunami that disabled the power supply and cooling of Japan's Fukushima Daiichi reactors, causing a nuclear meltdown and release of radioactive materials in March of 2011. In response, an industry representative explained:

> There have been spills in Saskatchewan and other places like Niger. We remediated and cleaned up, and satisfied regulators we had not injured wildlife and plants. We have measures in place so we never repeat these…risk is inherent to life on this earth, so it's up to us to evaluate how much risk we're willing to take. That's why we come to talk to you…I would encourage you to follow the International Atomic Energy Agency website. The ship was brought back to Vancouver. The Cameco website has a clear update on what happened to that ship. There is also the CNSC website.

This statement presents the unintended consequences of industrial development (i.e., spills) as completely manageable and (now) preventable, made possible through prior mistakes committed upon the environment as a living laboratory—any ambiguities in existing risk assessments are

effectively expunged. In addition, the environmental risks from uranium mining are presented as devoid of human agency and are framed as both a completely natural and inevitable part of Aboriginal peoples' lives. Industrial risks are also presented as something which NSEQC representatives have control over ("Risk is inherent to life on earth, so it's up to us to evaluate how much risk we're willing to take"). This framing assumes that northern Aboriginal communities are experiencing the same levels of risk as other societal groups, that Aboriginal participants will and should rationally assess risk estimates from industry, and that Aboriginal peoples possess decision-making power in this forum (which they do not). When the industry representative then states, "That's why we come to talk to you," they are also proclaiming that they can definitively determine those risks. Finally, it is NSEQC representatives that are problematized, which creates a diversion from attention towards industry's own culpability and history of spills.

Some NSEQC representatives did not hesitate to expose the limitations of risk assessment science and how it was being communicated. They were also frustrated with (biased) institutional development agendas, and the protective manner in which some industry representatives responded to their questions:

> The research was based on moving forward with the ore haul project, but was there any alternative perspective? With industry presentations we have good, solid questions, but I sense them getting defensive…We also lack verification of their findings e.g. with spills; we don't know the background of the research—the risk assessment for spills into rivers is based on assumptions.

Alternative options to the long haulage of ore slurry were considered, such as pursuing construction of a 66 km cut-across road from McArthur River to Cigar Lake (which the EQC generally preferred), air transport, a pipeline, or a winter road—but these were all rejected. The short-cut road was rejected because of higher costs and the extra time required for an environmental assessment and construction activities (Areva 2011b). Higher costs were the limiting factor for both plane transport and a pipeline alternative, while a winter road was rejected because of the short time-frame in which it could be used and the heavy weight of the trucks (Areva 2011b). An alternative to not processing the ore at all was rejected because there were no alternative sources of high grade ore to process through the mill, and it would mean further delays in commissioning of the mill (Areva 2011a), thereby diminishing profits. The rejection of the majority of these alternatives indicates that economic agendas dominated decision-making. It should be noted, however, that as of June 2012, the ore haul time-frame had been reduced from three years to three months, though it is not known whether NSEQC representatives' concerns influenced this decision.

Unlike Wynne's (1996) study where local community member observations of scientific inconsistencies, uncertainties, and erroneous assumptions were not expressed to scientists due to concerns it would invite denigration, NSEQC representatives were upfront about these issues and openly challenged industry and government scientists. This may be because the NSEQC is set up explicitly for inviting comment and questioning from community representatives. In addition, the failure of industry representatives to reveal the "messy" and imperfect assemblage of environmental risk assessments, including assumptions and uncertainties therein, is possibly due to fears of appearing weak and compensating for this through a portrayal of over confidence and false certainty (Wynne 1996). However, certain NSEQC representatives seem to think it may be more reflective of a "conspiracy theory," where both industry and government are purposefully hiding scientific uncertainties because of their economic interests in mining, as this representative indicated, "Industry is always giving us these reports, but how much do they cover up? How much money is going to the SK government from industry? Northern people are going to be left with the ruins!" Industry profits or provincial government revenues from uranium mining are not provided at NSEQC meetings. In 2008, the mining, oil, and gas industry in Saskatchewan accounted for 30 percent of the province's total Gross Domestic Product (Government of Saskatchewan 2011), by far the highest of any industry. In 2011, approximately $145.9 million in taxes and royalties were paid to the province of Saskatchewan from the uranium mining industry (Saskatchewan Mining Association 2011). What *is* continually stressed at meetings are the number of jobs, trainings, educational scholarships, and infrastructure development projects provided by industry to northern communities. The Saskatchewan Minister of First Nations and Métis Relations

came to one meeting and declared that the uranium industry "nurtures northern labour, employing 1562 northerners at last count. Industry spends more than $350 million each year on goods and services, two thirds of which goes to northern businesses or joint ventures. No industry has done better in delivering northern benefits."

Yet Aboriginal participants' comments told a different story—one of social injustice and uneven economic relationships with industry and/or government. These injustices included racism experienced working at mining sites, poverty in communities, and the limited number of jobs now available to northerners in the uranium mining industry: "The north is where we make our living. You take these [environmental] risks at our cost, and we're getting a few jobs. It's not enough. We should get more, because we are taking a big risk to allow you to exploit our territories." While northern participation in uranium mine employment rose from 31 percent in 1983 to 48 percent in 1998, it has since peaked and remained steady at 49.5 percent (Saskatchewan Mining Association 2011). According to an industry representative at the March 2012 NSEQC meeting, as of January 2012, 50.2 percent of Cameco's employees were northerners, and of those, 41 percent were Aboriginal. However, all of the entry level positions have been filled, and the only openings are in the technical, trades, and professional areas which require more education and training which the majority of Aboriginal people in Northern Saskatchewan do not have. This seems to reflect what Hecht refers to as an "ethnotechnical hierarchy" (2002, 699) within the mining industry, where those of Western European backgrounds occupy the more prestigious and powerful positions, which are associated with greater technical knowledge, training, and skills. At the same time, the long-term unemployment rates of northerners is four times that of the provincial rate, and in 2006 the median income of northerners was 60 percent that of the province (Irvine et al. 2011). As this Aboriginal representative expressed, "And the thing is you're taking the resources, and what do we get in return? It's nothing. Basically my Nation's broke…"

Comments relating to social and economic inequities of mining development often infused the NSEQC meetings, even where the topic at hand may have been environmental management of tailings ponds. On more than one occasion, certain industry representatives became frustrated by the direction the discussion was taking, and proclaimed that socio-economic issues were not part of the NSEQC's mandate. Though these industry representatives were wrong regarding the mandate—and this was pointed out to them—the more important point is that they *perceived* they were operating in an isolated, confined, and controlled space of techno-scientific information flows that can (and should) be severed from broader socio-economic experiences of Aboriginal peoples. Aboriginal participants, however, refused to accept the compartmentalized forms of information and scientific renderings of risk circulating within the NSEQC that betray their more critical understandings of scientific claims, institutional agendas, and power dynamics.

## Discussion and conclusions

The dissemination of techno-scientific information and the framing of risk within the NSEQC were not benign activities, but rather socio-political processes that rendered the development process as controllable, calculable, and predictable, and those pursuing it as environmentally and socially responsible. While this was done with the aim of engendering the trust and support of NSEQC representatives, it also served to justify industry's (and government's) continued pursuit of uranium development. This entailed presenting environmental risks from uranium mining as normal, natural, and inevitable; promoting abstracted forms of knowledge; the erasure, or at the very least glossing over, of embedded assumptions and details of scientific practices and assessments; and positioning Aboriginal representatives as recipients of scientific disciplining techniques. This techno-scientific information was offered up for consumption, but only by certain experts who could converge and organize this information ahead of time in carefully and cautiously selective forms; this enabled dominant political-economic agendas and capitalist practices to continue at the expense of Aboriginal populations. Technical knowledge thereby became the neocolonial basis for uneven social relations (Hecht 2002). As Keeling states, this is also part of a much larger, and longer (and as this study illustrates, ongoing) historical project that "… attempts to promote uranium mining as the basis for the industrial modernization of both people and the environment in Saskatchewan's north…" which

exemplifies "…the deep connections of resource-extractive activites to neocolonial ideologies" (2010, 247).

The goal of begetting trust and crafting hostages of scientific rationality went largely unrealized, however, as community representatives sought to claim their space, and reshape dominant discourses within the NSEQC by assertively and persistently displaying a range of expressions and challenges to the information they were being given. These were based on highlighting recent technological failures, asserting knowledge of local conditions, undermining scientific reassurances, and emphasizing industry representatives' (at times) defensive manner in relating to participants. In addition, community representatives underscored the substantial contrast in wealth and power between the province and industry relative to northern communities. This contrast didn't just provide a backdrop to environmental management of uranium mining—it often took centre stage as a fundamental issue within the NSEQC, vividly illustrating how techno-scientific information, and the institutions and development context within which this information is embedded, cannot, and should not, be disentangled.

Given this, one of the most pressing questions from this research remains why Aboriginal peoples continue to participate in the NSEQC. This is especially notable given the oft-voiced sense of powerlessness that community participants expressed, both directly and indirectly. Irwin et al. (1996) predict that distrustful citizens will withdraw from information-seeking activities which are of little practical value and don't reflect local realities, yet community representatives continue to participate in this forum. It may be that Aboriginal participants still perceive the NSEQC as an opportunity to negotiate concerns and maintain relationships based on their economic interests in mining, even if those economic possibilities are limited. They may also continue participating because they are speaking directly to those who are enabled to take action on particular issues (Irwin et al. 1996).

Perhaps ultimately what wasn't expressed is as important as that which was in this governance space; this encompasses not only the scientific assumptions and nature of uncertainties behind techno-scientific information and risk assessments, but also possibilities for participants to express alternative imaginaries of a Saskatchewan without uranium development. This is especially critical to consider given the importance of cultural values and morals within Indigenous ontologies that position humans as embedded within the environment, and which reject notions of human mastery or control over the environment, whether for development or environmental management purposes. But visions that would consider the expurgation of uranium mining from the Saskatchewan landscape would also be threatening, given not only their economic repurcussions, but also the potential for more empancipatory, Indigenous politics to emerge and be realized—including possibilities for legalizing the international principle of Free, Prior, and Informed Consent within the national or provincial context. The question remains then, as to what degree the NSEQC represents a more democratic, participatory process when deeper moral questions can't be raised (Beck 1995), the real origins of disaffection are not being addressed (Wynne 2002), and gross inequalities persist.

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