

Integrating Human Health into Environmental Impact Assessment: Case Studies of Canada's Northern Mining Resource Sector

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ABSTRACT. This paper examines the integration of human health considerations into environmental impact assessment (EIA) in the Canadian North. Emphasis is placed on the northern mining sector, where more land has been staked in the past decade than in the previous 50 years combined. Using information from interviews with northern EIA and health practitioners and reviews of selected project documents, we examined three principal mining case studies, northern Saskatchewan uranium mining operations, the Ekati diamond project, and the Voisey's Bay mine/mill project, to determine whether and how health considerations in EIA have evolved and the current nature and scope of health integration. Results suggest that despite the recognized link between environment and health and the number of high-profile megaprojects in Canada's North, human health, particularly social health, has not been given adequate treatment in northern EIA. Health considerations in EIA have typically been limited to physical health impacts triggered directly by project-induced environmental change, while social and other health determinants have been either not considered at all, or limited to those aspects of health and well-being that the project proponent directly controlled, namely employment opportunities and worker health and safety. In recent years, we have been seeing improvements in the scope of health in EIA to reflect a broader range of health determinants, including traditional land use and culture. However, there is still a need to adopt impact mitigation and enhancement measures that are sensitive to northern society, to monitor and follow up actual health impacts after project approval, and to ensure that mitigation and enhancement measures are effective.

Key words: health, integration, environmental impact assessment, mining, Canada, North

RÉSUMÉ. Dans cet article, on se penche sur l'intégration des considérations en matière de santé humaine dans le cadre de l'évaluation des incidences environnementales dans le Nord canadien. On met l'accent sur le secteur minier du Nord, où plus de terres ont été jalonnées ces dix dernières années que pendant les 50 années précédentes. À la lumière des commentaires obtenus en entrevues avec des spécialistes des évaluations environnementales et de la santé du Nord ainsi que de l'examen de certains documents de projets, on a examiné trois études de cas principales portant sur l'exploitation minière – soit les exploitations d'uranium du nord de la Saskatchewan, le projet de diamants Ekati, et le projet de mine et d'usine de la baie Voisey – afin de déterminer si et comment les considérations en matière de santé dans le cadre de l'évaluation des incidences environnementales ont évolué ainsi que la nature et l'étendue actuelle de l'intégration de la santé. Les résultats indiquent que malgré le lien manifeste entre l'environnement et la santé ainsi que le nombre de mégaprojets de haut calibre entrepris dans le Nord canadien, la santé humaine, et plus particulièrement la santé sociale, n'est pas traitée adéquatement dans le cadre de l'évaluation des incidences environnementales du Nord. Généralement, les considérations de santé dans le cadre de l'évaluation des incidences environnementales se limitent aux incidences d'ordre physique directement attribuables aux changements environnementaux découlant du projet, alors que les déterminants d'ordre social ou autre n'ont pas été considérés du tout ou se sont limités aux aspects de la santé et du bien-être que les promoteurs du projet contrôlaient directement, notamment les occasions d'emploi, de même que la santé et la sécurité des travailleurs. Ces dernières années, on a enregistré des améliorations sur le plan de la santé dans le cadre de l'évaluation des incidences environnementales afin de tenir compte d'une gamme plus vaste de déterminants en matière de santé, ce qui comprend l'utilisation traditionnelle de la terre et la culture. Cela dit, le besoin d'adopter des mesures de mise en valeur et d'atténuation des incidences qui respectent la société du Nord se fait toujours sentir, de même que des mesures qui permettent de surveiller et de suivre les incidences réelles sur la santé une fois les projets approuvés. Il y a aussi lieu de s'assurer que les mesures de mise en valeur et d'atténuation portent fruits.

Mots clés: santé, intégration, évaluation des incidences environnementales, exploitation minière, Canada, Nord

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INTRODUCTION

Environmental impact assessment (EIA), broadly defined, is a planning process to predict, assess, and mitigate the potential impacts of project development on the biophysical and human environment. The inclusion of health impacts in project assessment is receiving increased attention from EIA and health practitioners alike (e.g., Arquiaga et al., 1994; Banken, 1999; Steinemann, 2000), and many health authorities, including the World Health Organization (WHO, 1987) and Health Canada (1999), have recognized the need for and benefits of addressing health in EIA. An international study of the effectiveness of EIA by Sadler (1996), however, revealed that health and other human impacts either are not considered or are not given adequate treatment in project EIA. Burdge (2002) and Joffe and Sutcliffe (1997) agree, suggesting that EIA often fails to address the impacts of project development on human communities and culture. In the Canadian context, a 1990 workshop sponsored by the Canadian Environmental Assessment Research Council (CEARC, 1991) concluded that the processes that evaluate the effects of proposed developments on Canada's North have not given adequate consideration to human health. No substantive evaluation of health integration into EIA in Canada's North has been made since that time, and there is little understanding of the current state of practice.

This paper examines Canada's experience with integrating human health considerations into northern EIA, particularly within the context of Canada's northern mining resource sector. From Prime Minister Diefenbaker's 1958 "Road to Resources" program for the Canadian North to the more recent discovery of world-class nickel deposits at Voisey's Bay, Labrador, Canada's northern mining sector has strongly reflected the history of EIA; thus, one would expect to see considerable learning from experiences and process improvements in EIA and health integration. This paper identifies learning opportunities for improving the integration of health into EIA and recommends ways to move northern EIA forward to a more inclusive and contextually relevant approach to health assessment. After setting the context for health assessment in northern EIA and presenting three case studies, we turn to a more directed discussion of the lessons learned for health integration and venture a number of observations about the nature, evolution, and direction of northern EIA and health integration.

CANADIAN NORTHERN EIA

In Canada, EIA was formally enacted in 1973 by the federal Environmental Assessment Review Process (EARP), which was replaced by the Canadian Environmental Assessment Act in 1995 and revised in 2003. Responsibility for EIA is shared between the federal government and each of the provinces and territories. The

federal EIA process is triggered when a proposed project will potentially affect an area of federal responsibility, or involves federal support, or is likely to cause transboundary impacts. North of 60°, EIA is under federal jurisdiction but in concert with various laws and regulations of the territorial governments (Mulvihill and Baker, 2001). Exceptions include projects within the jurisdiction of the Mackenzie Valley Resource Management Act (Canada, 1998), where project assessment is the responsibility of the Mackenzie Valley Environmental Impact Review Board, and projects under the Nunavut Land Claims Agreement Act. A brief history of EIA in northern Canada will set the context for our evaluation of EIA and health integration.

In 1970, the U.S. Department of the Interior submitted a six-page environmental impact statement (EIS) to accompany a proposal to construct a 3860 km long Trans-Alaska Pipeline from Prudhoe Bay to Prince William Sound. The project would involve the transport of natural gas from Prudhoe Bay, Alaska, down through the Mackenzie Valley of Canada's Northwest Territories. In 1973, following the decision to build the pipeline, an Inuit leader asked: "Now that we have dealt with the problem of the permafrost and the caribou...what about changes in the customs and ways of my people?" (Shantz, 2002:3). Such concerns were addressed by Chief Justice Thomas Berger, who led the 1974 inquiry into Canada's projected Mackenzie Valley pipeline, which would extend from the Beaufort Sea, Alaska, to Alberta, Canada. The inquiry was the first of its kind in Canada to consider the potential impacts of development on the northern environment and the well-being of northern communities. Judge Berger concluded that impacts on the culture, society, and health of indigenous populations were reasons to decline the permit for pipeline construction. The proposal to build the pipeline preceded the institution of formal EIA procedures (Mulvihill and Baker, 2001), but the Berger Inquiry would change the prospect of northern development and the consideration of human impacts. It is against this backdrop that we examine Canada's experiences with health integration in EIA in the northern mining resource sector.

Study Methods

In the following sections we introduce case studies of EIA in three principal northern mining projects (Fig. 1). The three case studies illustrate principles and practices of health integration and provide a broad geographic and temporal perspective on the state of health impact assessment, but they are not meant to represent all northern EIAs. Initial case study selection was based on discussions with key informants in northern EIA and community health practice. The criteria for final selection were that the mining EIAs (1) had been carried out under either federal-provincial or federal-territorial EIA processes, (2) had undergone either a comprehensive study or panel review assessment, and (3) represented a broad temporal perspective in the evolution of Canadian EIA. Canada has four

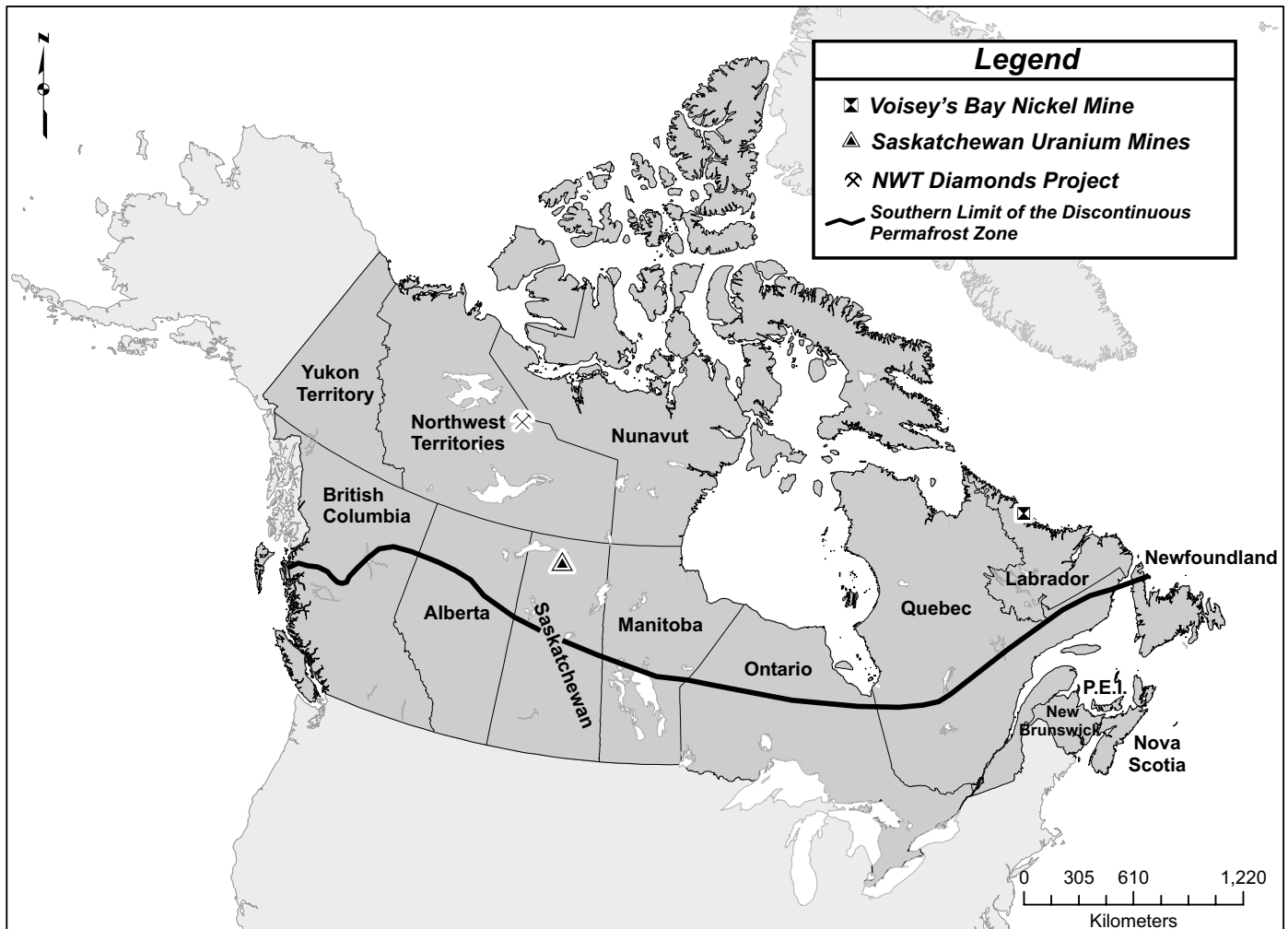


FIG. 1. Locations of mining projects used as our three case studies of environmental impact assessment in the Canadian North.

types of environmental assessment: screening, mediation, comprehensive study, and assessments by a review panel. A comprehensive study EIA applies to those projects identified on the federal Comprehensive Study List Regulations (see www.ceaa.gc.ca/013/act_e.htm). Such projects are usually large projects, including oil and gas developments, having the potential to generate significant adverse environmental effects or public concern. Comprehensive study EIAs are carried out under the direction of the project proponent. For comprehensive study EIAs where uncertainty is high, or where the Minister of Environment considers it necessary, a review panel rather than the proponent may conduct the EIA. A review panel is a group of independent experts appointed by the Minister to review and assess the proposed project's impacts and to make recommendations for impact mitigation.

The case study analysis used a mixed methods approach, incorporating information from document reviews, key informant interviews, and the authors' personal experiences in EIA (see Gomm et al., 2000; Silverman, 2001). For each case study, we acquired the project impact statement, terms of reference, management plans, monitoring

documents, and (where applicable) panel reports from the proponent, libraries, or government registries. We analyzed project documents for evidence of the consideration of health impacts, first by reviewing the table of contents and then by a more detailed analysis and key word search of the relevant document sections. Our conceptualization of health was based on the Constitution of the World Health Organization's (1948) definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." For our document review and key word search, we adopted Health Canada's (1999) framework, which identifies determinants of health, including education, childhood development, biology and genetic endowment, health services, personal health practices and coping skills, income and social status, social support networks, physical environments, and employment and working conditions.

To supplement the document review, and to gain further insight into the case studies, we interviewed 24 EIA and health professionals who had experience with impact assessment in northern Canada. The interviewees were identified from the health impact assessment literature and

recommendations of our initial key informants. Interviews were conducted, either face-to-face or by telephone, from September to December 2004. Interviews were informal but semi-structured, in the sense that participants were asked to comment, for example, on the state of practice of human health integration in northern EIA, focusing particular attention on the nature of health assessment and examples of “good” and “poor” practices. As the results presented in this paper are part of an ongoing research project examining the state of practice of health integration in Canadian EIA, here we discuss only those interviews relevant to the three case studies. The names of individual respondents are withheld to ensure confidentiality, but each respondent’s organization and general profession are provided to support data quality and reliability.

PRINCIPAL CASE STUDIES

Saskatchewan Uranium Mines

Since the Rabbit Lake uranium discovery in 1968, the Athabasca Basin of northern Saskatchewan has become the world’s premier exploration region for high-grade uranium deposits. The northern region of Saskatchewan is home to several uranium deposits. Mining and milling operations include the initial Rabbit Lake mine and Eagle Point extension, the recently decommissioned Cluff Lake mine, Cigar Lake, McLean Lake, McArthur River mine and Key Lake mill, and the soon to be developed Midwest property. We focus here on three key projects: the initial Rabbit Lake–Eagle Point Extension, the decommissioned Cluff Lake mine, and the more recent McArthur River project. Together, these three projects illustrate what might be considered a learning curve in northern EIA and health integration.

Rabbit Lake–Eagle Point Extension: In 1987, exploration activity near the Rabbit Lake mine site identified several additional radioactive occurrences. Subsequently, Cameco Corporation, the project proponent, submitted an EIS to federal and provincial regulatory agencies for approval to mine three new ore bodies in the Rabbit Lake area, known as the Eagle Point Extension. Following its review of Cameco’s EIS, the Atomic Energy Control Board (now the Canadian Nuclear Safety Commission), the federal agency responsible for the administration of uranium mining and processing, determined that the environmental effects of the Eagle Point Extension project would be manageable and issued a license for test mining of the Eagle Point ore body.

Four years later, in 1991, the federal Minister of the Environment appointed a joint federal-provincial environmental assessment panel to examine the regional environmental, health, and socioeconomic effects of all uranium mining activities in northern Saskatchewan. Among the projects to be reviewed by the panel was the Eagle Point Extension project. Cameco updated its 1987 EIS and

submitted it to the panel for review in 1992. The panel’s final report, released in 1993, identified contamination of the biophysical environment, exposure pathways to radionuclides, and heavy metals at the Eagle Point Extension site as primary concerns (Rabbit Lake Uranium Mine Environmental Assessment Panel, 1993). As indicated by one of our interviewees, the panel “...took great care in addressing human health issues. One of the obvious reasons is the adverse impacts of radiation, which drew considerable attention” (Interviewee, Environment Canada, pers. comm. 2004).

Cameco Corporation, in response to the Panel’s report, noted that it had been monitoring the local biophysical environment for more than two decades, since the initial Rabbit Lake mine project, and had data concerning approximately 7000 samples of the local environment (Rabbit Lake Uranium Mine Environmental Assessment Panel, 1993). The Panel’s main concern was the quality of Cameco’s data collection process and the relevance of the data themselves, specifically the protocol for testing radionuclides and trace elements in fish—a health risk exposure pathway for northern residents. The Panel noted that data collection and testing procedures had changed in 1982, 1984, and 1986, and data collected during 1989 and 1990 had been discarded because of poor quality and inconsistencies in measurement. Thus, notwithstanding a decade of environmental monitoring, there were few comparable health data concerning the effects of mining operations on fish, a resource of considerable social and cultural value to northern communities. The Panel concluded that the monitoring program had failed to provide assurance to northern residents, those most affected by the project, as to their health and safety (Rabbit Lake Uranium Mine Environmental Assessment Panel, 1993).

Cluff Lake: The Cluff Lake mine operated from 1980 to 2002. Like the Rabbit Lake–Eagle Point Extension, the Cluff Lake EIA emphasized the biophysical components of project effects and the physical components of health, namely risks of exposure to radiation. In its final report, the Cluff Lake Board of Inquiry, the committee assigned to review the project, clearly recognized the difficulty of assessing the social and other health impacts of uranium mining activities on northern residents: “There now exists in the North (and it has nothing to do with uranium mining) a social disorder...To superimpose upon that kind of society a project such as a uranium mine and mill which has the potential of exacting additional social costs and then try and measure those additional costs presents a near impossible task” (Cluff Lake Board of Inquiry, 1978:174).

Thus, for the most part, social health impacts were not addressed in the Cluff Lake assessment for lack of direct causal links. The project did address, however, those impacts on communities and well-being over which the proponent had direct control, namely employment, business opportunities, involvement in the EIA process, sponsorships, and donations. In our discussions, uranium industry representatives confirmed this ongoing challenge to health assessment, suggesting that there are often “too

many confounding factors in the [northern] communities to ever be able to tell whether there was an effect or not since all communities are too far away for a direct effect based on ecological risk and pathways monitoring” (Saskatchewan uranium industry representative, pers. comm. 2004). However, as another interviewee pointed out, it is because “...aboriginal communities are already stressed [and] communities are at risk because health status is already poor...” that we should be particularly attentive to the existing health and social concerns of northern communities (Medical anthropologist, pers. comm. 2004).

The Cluff Lake mine concluded its last year of production in 2002 and was issued a license for decommissioning in July 2004. The environmental assessment report of the Cluff Lake decommissioning phase, prepared by the Canadian Nuclear Safety Commission (CNSC, 2003), continues to reflect the project’s emphasis on physical health. The primary health-related issues of decommissioning concern potential exposure to radiation by direct and indirect ingestion of contaminated water from sites used for hunting and other land-use activities (CNSC, 2003). There is little discussion, for example, of the potential to disrupt traditional hunting and land-use patterns themselves, or the implications of such impacts for the health of northern residents.

McArthur River: The above experiences with health assessment in EIA, while quantitatively rigorous at times, were narrow in scope, limited to physical health risks, and confounded by the complexity of factors and pathways that lead to health impacts. Building on the experiences of the Rabbit Lake–Eagle Point Extension and Cluff Lake projects, underground exploration at the McArthur River mine site commenced in 1993, and in 1997, a joint federal-provincial environmental review panel granted project approval. Since operations began in late 1999, McArthur River has continued to be among the world’s most productive mines for highest-grade uranium, with a production capacity of 18 million pounds of U_3O_8 in 2001.

The scope of health considered in the McArthur River EIA is broader than that of the Rabbit Lake–Eagle Point Extension and Cluff Lake assessments. The assessment process reflects the WHO (1987) definition of health, which includes not only disease-related effects, but all impacts that might affect the well-being of populations. The McArthur River EIS specifically includes social well-being and quality of life in its definition of health, recognizing the links between health and various physical and social health determinants (McArthur River EA Panel, 1997). The potential health impacts of uranium mining activities were assessed within this broader conceptualization of health, including cumulative health effects. Three health-based monitoring and assessment programs were emphasized:

- an assessment of physical health effects in northern communities based on monitoring of environmental contaminants;

- an epidemiological assessment of cancer risks and mortality;
- a broader social and community health assessment based on several determinants of health, including employment, income, education, housing, environment, lifestyle, and traditional land-use activities.

The integration of traditional land-use activities as a determinant of health goes beyond the current Health Canada (1999) framework of health determinants to address a particular component of health specific to northern environments. As a nutritionist with the Yellowknife Health and Social Services Authority suggested (pers. comm. 2004), it is important to the health of Northerners for outsiders to adopt the aboriginal worldview. Several other interviewees similarly noted the importance of adopting such a perspective when assessing health impacts:

The life style issue, more than anything else, is the most important difference [in the North]. For people out on the land, EIAs are essential. We are changing where animals can and can’t go. (Health Canada, Northern Region representative, pers. comm. 2004)

In each of the determinants of health, all are quite different between the north and the south. (Nutritionist, Yellowknife Health and Social Services Authority, pers. comm. 2004)

Understanding of the value of First Nations’ and northern residents’ place on the land is important for consideration: as the determinants of health are so broad, so is the use of land. (Medical officer, Northwestern Health Unit, pers. comm. 2004)

In this regard, the McArthur River project illustrates a significant step forward in the scope of health impacts considered in northern EIA.

Northwest Territories Diamond Mine

The recent surge in diamond mining and exploration has ... heavily impacted the culture, economies and social infrastructure of communities and individuals. Although physical health impacts are not a concern, the impacts to spiritual, cultural and economic and social infrastructure are large compared to environmental impacts. (Northern EIA consultant, pers. comm. 2004)

In 1994 the Canadian Department of Indian Affairs and Northern Development initiated an environmental review of Canada’s first diamond mine, Ekati, located 300 km northeast of Yellowknife in the Northwest Territories (NWT). The proposed diamond mine would be developed in an area of unsettled and overlapping aboriginal land claims in a region with little previous industrial development. The proponent, now BHP Billiton (BHPB), submitted its eight-volume, 5000 page assessment document in

1994, and a full review followed. The Ekati project represents a significant milestone in northern EIA and health integration for two reasons: its attention to northern context and socioeconomics with respect to maximizing the benefits of local employment and its development of a socioeconomic effects monitoring program.

Following the announcement of the Ekati mine project, BHPB held public information meetings in ten regional northern communities likely to be most affected by the proposed development (BHP Diamonds Inc., 1996). During the public meetings, a number of communities (e.g., Dogrib Treaty 11 Snare Lake, Dogrib Treaty 11 Yellowknife) raised concerns that the mine might disrupt traditional ways of life, including hunting and fishing patterns, and bring with it a range of problems often attached to the introduction of a money-based economy (see, for example, BHP Diamonds Inc., 1996: Vol. I, Appendix I-D8 to I-D11). As one interviewee explained:

Employees ... can buy a truck at cost but don't know how to manage their money, so they still need to be able to pay for it. In reality, children are hungry. Some workers don't even make it home from Yellowknife on their days off. This causes an impact on the culture itself. Men are working, which may cause them to miss the opportunity to go caribou hunting, which has been a part of their culture. There is a perception that because there is development it is a good thing, but there are problems associated with development. Development brings employment to the people, which is new money. They don't know how to budget. This causes social issues such as social abuse, substance abuse, family violence. They don't have the infrastructure to handle these problems. (Yellowknife Health and Social Services Authority representative, pers. comm. 2004)

The Panel reviewing the mine project concluded in 1996 that the mine would significantly benefit Northerners and that its predicted impacts could be mitigated (CEAA, 1996). The Panel noted, however, that specific management actions were necessary, including the consideration of social and cultural traditions and land-use patterns, physical health, demographics, education and employment, financial management assistance programs for northern employees, and public social services and infrastructure. The proponent responded to the Panel's recommendations with a commitment to local job creation, community meetings, and cross-cultural training; education and employment training programs; and community-based committees to deal with emerging social health problems and help Northerners not traditionally engaged in a money-based economy to deal with stress and financial management (Kwiatkowski and Ooi, 2003).

The second component of the Ekati project worth noting, particularly when compared to the earlier Rabbit Lake–Eagle Point Extension, is the development of a monitoring partnership between BHPB Ekati and the

Government of the NWT, which had already been collecting data on a number of social health and wellness indicators for the territory (CEAA, 1996). Public statistics for 14 indicators were identified for monitoring in order to assess the effects of the Ekati mine on the health and well-being of northern communities, including injuries, number of teen births, suicide rates, alcohol-related crimes, family violence, communicable diseases, and average household income. Initially, communities in the West Kitikmeot Slave area (Łutselk'e, Rae-Edzo, Rae Lakes, Wha Ti, Wekweti, Detah, and Ndilo) and Yellowknife were monitored. Then the data collected and reported there were compared to information for the rest of the NWT (see GNWT, 2000, 2001). The monitoring program has since been adopted by the nearby Diavik mine.

While Ekati's monitoring program is a step in the right direction toward integrating consideration of health and social concerns into EIA, the data collected indicate only overall changes within the region. Thus, the results are inconclusive in linking social and health changes in the individual communities to diamond mining activities (Noble and Storey, 2004). The coarseness of the indicators used to measure change associated with health and well-being, and the small size of some communities on which observations are based, makes it particularly difficult to identify project-induced effects on human health and well-being.

Voisey's Bay Mine/Mill Project

In 1993, a rich nickel-copper-cobalt deposit was discovered at Voisey's Bay, on the northern coast of Labrador. The proponent, Voisey's Bay Nickel Company Limited (VBNC), a subsidiary of Inco Limited, submitted a proposal in 1997 to develop a mine/mill complex and related infrastructure for producing mineral concentrates at Voisey's Bay. In the absence of land-claim agreements, the Voisey's Bay mine/mill project was subject to assessment as set out under federal and provincial processes and pursuant to a memorandum of understanding (MOU) between the provincial and federal governments, the Labrador Inuit Association, and the Innu Nation.

In comparison to the previous cases, the Voisey's Bay project represents what could be considered a significant achievement in its requirements for integrating health concerns into northern EIA. The MOU, for example, required the proponent to follow specific guidelines when preparing its impact statement, giving special consideration to traditional land-use activities and patterns, housing, quality of life, health, diet and country food dependency, morbidity and mortality, and the interactions between these indicators (Canada et al., 1997). An interviewee from Health Canada identified the Voisey's Bay assessment as "one of the more comprehensive northern EIAs completed in that it considered health impacts on the local Innu and Inuit populations in detail, particularly project effects on traditional land use activities and wildlife migration patterns" (Health Canada, Northern Region representative, pers. comm. 2004).

From a health perspective, the Voisey's Bay project is noteworthy for at least two features: its sustainability mandate and its consideration of gender-based impacts. First, sustainability beyond the life of a project is of key concern in resource-dependent communities (e.g., Bradbury and St. Martin, 1983; Bowles, 1992). As one interviewee said, "Northern developments are rarely sustainable when natural resources are used, such as mining [or] forestry. Usually developments require temporary infrastructure for health, services and transportation. Deterioration of these services occurs when the development ceases to exist and this may leave the community disabled" (NWT medical officer, pers. comm. 2004).

The Voisey's Bay mine was the first project in Canada's North to adopt an explicit sustainability mandate. The impact statement guidelines developed for VBNC identified the sustainability criterion as a guiding principle for project development, noting that EIA should go beyond minimizing damage and require a project to maximize long-term, durable net gains (Voisey's Bay Mine and Mill Environmental Assessment Panel, 1997). This mandate is reflected in the Voisey's Bay EIS: "Without the Project, the population...will continue to increase, leading to increasing demands for housing and related municipal services and infrastructure. Such increased demands will only compound the many existing family, social and health problems in the community" (VBNC, 1997: Vol. 4:24.16).

There is some argument, however, that while the project had an explicit mandate to make an overall positive contribution to the health of northern communities, insufficient attention was given to the specific health impacts that project development would generate. Volume 4, Chapter 24 of the EIS, for example, identifies a number of existing social health issues and concerns in the project region, including family violence, child neglect, poor nutrition, and substance abuse; however, a Health Canada (1998) review of the impact statement suggested that very little attention was given to direct impacts of the project on current social and health conditions. Archibald and Crnkovich (1999) go one step further, suggesting that the proponent took advantage of the existing social and health challenges facing the Labrador Inuit communities to promote the positive contributions of the project without giving sufficient attention to real, negative project impacts.

Second, the Voisey's Bay EIA is unprecedented in the panel's requirement to incorporate gender-based issues, including gender-based health concerns, in the project assessment. When the Voisey's Bay project was announced, the Tongamiut Inuit Annait Ad Hoc Committee on Aboriginal Women and Mining in Labrador raised a number of concerns about the social health of women, including disruption of marriage and family life, increased responsibilities for women in the home, inadequate employment opportunities for women, and sexual harassment in the workplace. At the initial public hearings for the Voisey's Bay project, the Committee pointed out that the last federal assessment process in the region, the 1994 EIA of low-

level military flight training operations, had not adequately considered the project's impact on women's health (CEAA, 1997). In an unprecedented move, the Panel instituted guidelines requiring VBNC to undertake a gender-based assessment of project impacts (Voisey's Bay Mine and Mill Environmental Assessment Panel, 1997). The outcome of implementing those guidelines, however, was less exceptional: while the project EIS did identify gender-based concerns, there was very little actual assessment of how different project aspects might affect the health of Inuit women and what impact management measures would be necessary (see VBNC, 1997: Vol. 4:24).

OBSERVATIONS

We now venture a number of observations, based on the case studies, concerning the integration of health and EIA in Canada's North. First, in cases where health is identified as an important issue to consider in northern EIA, attention has traditionally focused on the direct impacts of project development on human health, particularly physical health, due to environmental change caused by project actions. This finding is consistent with the previous report by Frankish et al. (1996), who judged the scope of health in EIA to be limited to the physical environment. The Rabbit Lake-Eagle Point Extension and Cluff Lake projects, for example, focused almost exclusively on physical health and the potential health risks from radiation exposure. Similarly, in the 1976 Beaufort Sea EIA of proposed oil drilling operations, the scope of health effects was limited to the physical health and safety of project employees, and in the environmental assessment panel's report on the Arctic Pilot natural gas project (FEARO, 1980), the recommendations did not even mention the phrase "health effects."

Integrating health into northern EIA requires a more inclusive consideration of both physical and social health impacts, based on the recognition that human health and social and environmental well-being are inextricably linked. Vanclay (2003) agrees, arguing that "environment" should be defined broadly to include social and human dimensions, and care must be taken to give adequate attention to the social realm. In response to the BHPB Ekati proposal, for example, the chief of the Yellowknives Dene Band commented, "Anything that happens in our territory is not just environmental in nature: it impacts our culture, economy, [and] spiritual relationship with the land" (BHP Diamonds Inc, 2000:29). Davies (1992) similarly suggested the need for a much broader conceptualization of health and well-being, pointing out that rapid northern development could lead to social disruption and increase social and psychological health problems if economic growth and development do not consider the social context in which they occur, or the underlying assumptions and values that they embody. As one of our interviewees suggested, "The impact of projects is much greater in the north. The influx of money into northern areas brings social problems such as alcoholism, violence, radical change to

traditional ways. Most...impact assessments do not look at these issues, yet they could have the most significant impact on the individuals in these areas” (Health Canada, Northern Region representative, pers. comm. 2004).

Experience suggests, however, that in those cases where social health and well-being are addressed in northern EIA, emphasis tends to be on those elements over which the proponent has direct control, notably local employment and business opportunities. This emphasis may be due in part to the definition of “environmental effect” under current and previous Canadian environmental assessment legislation (e.g., Canada, 1984, 2003), which focuses primarily on the implications of project developments for the physical environment, addressing human or health impacts only when they are caused by environmental changes directly due to project actions. Social, economic and other “human environmental” effects are examined where relevant, but their inclusion is often an indirect one.

Second, the complexity of the relationships between environmental change and health often make it difficult to construct models that successfully quantify and predict, with any degree of accuracy, the impacts of a project on human health. As illustrated by the Cluff Lake uranium mine, predicting social health impacts poses a significant challenge to EIA, as the linkages between project actions, environmental change, and health outcomes are often difficult to establish. Birley (2002:33) agrees:

The link between health outcomes and health determinants is complex and multi-factorial. There may be substantial time lags, feedback and an absence of known parametric functional relationships between cause and effect. One response to this uncertainty is to focus the assessment on the determinants of health rather than the health outcomes. The assessment must weight the evidence regarding the likely changes in health determinants and then provide a reasoned argument as to whether the net effect of these changes will be beneficial or detrimental to the health of specified community groups.

Assessing the health implications of development on Canada’s North will require EIA to focus on health determinants, the sources of change contributing to health impacts, and the desired and likely direct and indirect effects of project actions on those determinants. Progress is being made in this regard. Both the McArthur River and Voisey’s Bay projects reflect well on the early integration of a broad range of health determinants, including social health determinants, into project assessment, and the Voisey’s Bay project includes determinants that are specific to gender-based health concerns. As one interviewee noted, “Certain health issues of concern for the North are more with the broader social determinants of health. Lifestyle is key for a healthy community for many Northern residents” (Health Canada, Northern Region representative, pers. comm. 2004).

Third, as O’Neil and Solway (1990) argue, not only should health be an integral part of northern EIA, but no project should be approved in the North unless it makes a positive contribution to health conditions. The Voisey’s Bay project showed that EIAs can and should adopt a mandate to create or enhance project-related outcomes that contribute to human and community health and well-being. One of the main challenges to northern EIA, however, is to ensure that such benefits are consistent with the current cultural base and values of northern societies. As a Coppermine resident noted during the Ekati public hearings on employment opportunities and job creation, “...the idea of banking is so foreign to most of us that you think, I got money, I should spend it” (BHP Diamonds Inc., 1996: Vol. IV, Section 4:238). It is thus important to commit not only to local job creation, but also to the establishment of community-based worker support groups to assist in handling work-related stress and financial resource management. As Wismer (1996:23) explains, “The nature of the work, its scheduling into shifts that are often at least two weeks in length, the distance of mine sites from home communities, and the need for a consistent and reliable workforce that does not take time off on a seasonal basis, creates a situation in which the benefits of employment in the mines are often offset by the costs of social and family disruption and loss of opportunities to participate in community life.”

Traditional and cultural norms can be quickly displaced as remote northern communities become involved in paid labour and service provision. Such problems are often exacerbated, argues Davies (1992), when developers inject new jobs and income into societies without considering culturally appropriate forms of development and resource allocation.

Our final observation based on the case studies is that consideration of health issues in EIA, when it does occur, has usually been limited to the level of baseline studies and impact prediction. Our case studies offer little evidence to suggest that health concerns, particularly issues associated with social health and quality of life, carry over to the post-decision monitoring stages of the EIA. In those cases where social health issues are monitored, they rarely seem to be monitored well. The proponent of the Rabbit Lake–Eagle Point Extension project, after more than a decade of monitoring, was unable to determine whether the project was generating significant adverse effects on fish, an important food source for northern communities. In the Ekati case, while the proponent did commit resources to a monitoring program focused on various indicators of health and social well-being, those indicators may be too coarse to allow tracking of project-related change in small northern communities with any degree of confidence, and monitoring results are not reported regularly. In short, the monitoring of health and social impacts does not appear to be treated with the same scientific rigor as the monitoring of biophysical impacts.

CONCLUSION

Approaches to EIA vary considerably in the North (Mulvihill and Baker, 2001). In Canada's more than 30 years of experience with northern project development and EIA, notwithstanding the high visibility of such megaprojects as uranium and diamond mines, there appears to be little consistency in the integration of human health issues into project assessment. It is not that health is absent from EIA in Canada's North, but that there exists "...no evidence that human health issues are being incorporated very well" (Yellowknife Health and Social Services Authority representative, pers. comm. 2004). In the words of one key informant, the integration of health into EIA in Canada's North is "...still an afterthought, not [considered] as central" (Northern anthropologist, pers. comm. 2004). Our case studies and experience do suggest that we are seeing improvements in the integration of human health in northern EIA practice. As an interviewee from the Inuvik Regional Health and Social Services Authority said, "human health issues were not incorporated into EA despite legislation...however, things are slowly changing" (pers. comm. 2004). Health agencies such as the NWT Environmental Health Unit, for example, are playing increasingly important roles in project assessment by regulating and advising project licensing and approval organizations, such as the NWT Land and Water Board and the Sahtu Land and Water Board.

In conclusion, given the relationship between environment and well-being, we believe that human health, particularly social health, has not been given adequate attention in northern EIA. We can and need to do a better job of assessing health issues in northern EIA. However, the institutional framework of EIA and the EIA process itself are not sufficient at present to assess and promote human health through project development in Canada's North. If in fact the goal of Canadian EIA, as stated in the Preamble to the Canadian Environmental Assessment Act (Canada, 2003), is to contribute to development that is sustainable, then the impacts of project development on human health must be considered alongside biophysical and other human-environment variables. In order for this to happen, several institutional and EIA procedural actions are required:

- adopting a more inclusive definition of health, to include physical, social, and other cultural dimensions specific to northern society;
- giving attention to the determinants of health and to the desired health outcomes, rather than the most likely ones;
- designing management and mitigation programs to be contextually relevant and sensitive to northern culture and environments to ensure that projects contribute to health and quality of life;
- monitoring health determinants and actual health outcomes to ensure that those management and mitigation programs are meeting their intended objectives.

All of this is of little use, however, unless developers are committed and required to consider both the direct and indirect impacts of project development on human health, and a responsible party exists to ensure that such issues are appropriately addressed. As noted by the Yellowknife Health and Social Services Authority representative (pers. comm. 2004), "there is a perception that the companies are including health, but how well are they doing it?...it may just be lip service."

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