University of Alberta

Comparison of the socio-economic impacts of the Nanisivik and Polaris mines: A sustainable development case study

by

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Abstract

This study qualitatively examines residents' perceptions of the socio-economic impacts of the Nanisivik and Polaris mines on their neighbouring Nunavut communities. The objective was to learn how current and future mining in Nunavut can better establish long-lasting, positive socio-economic benefits according to current sustainable development practices. The results reveal that community members felt the mines had: positive economic impacts because new businesses were created and many residents benefited from increased incomes; few social impacts other than increased alcohol consumption; and mixed employment impacts because employment was available to local Inuit but training was limited. Overall the benefits were not numerous and did not persist after mine closure, showing that these mines did not assist with sustainable development of the region. To increase socio-economic benefits and assist communities in their sustainable development, mining companies in Nunavut should focus on their relationships with involved stakeholders, such as governments and community councils.

Acknowledgments

This project has allowed me to extend my knowledge of the impacts of mining on communities, and now positions me to take the steps to ensure that mining is done in a socially and economically responsible fashion.

This project was initiated by Ross Sherlock while he worked at the Canada-Nunavut Geoscience Office, after discussions with my supervisor Jeremy Richards. I would like to thank both for finding a project that suited my interests and goals.

The research could not have been done without the financial assistance of many different organizations and the people that work there, namely: the Canada-Nunavut Geoscience Office, Natural Resources Canada, Indian and Northern Affairs Canada, Nunavut Tunngavik Incorporated, the Government of Nunavut, and the Polar Continental Shelf Project. Thank you and I hope that this thesis will help in your work to make mining in Nunavut beneficial to all Nunavummiut.

I am indebted to my interpreters in Resolute and Arctic Bay, Ross Pudluk, Tony Ullikataq, and Audrey Qamanirq, without whom I could not have conducted my interviews. I also want to thank everyone who helped me in both communities and gave me the opportunity to interview them. It made my experience there more interesting and memorable. I would like to add an extra thank you to Nataq Levi who opened up his home for me in Arctic Bay, and was patient enough to answer all my questions about the Inuit culture; he opened my eyes to its amazing traditions.

Finally, I want to thank my committee, Jeremy Richards and Tara McGee, for their suggestions, ideas, and support during my masters. Both have given me new perspectives and ideas and have helped me organize the myriad of thoughts in my head into a coherent package.

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Chapter 1
Introduction

Nunavut, Canada's newest territory, has become an important region for mineral exploration in the past few years, mainly due to the presence of several promising mineral deposits including the Hope Bay, Meliadine, and Meadowbank lode-gold deposits, the Mary River iron deposit, the Izok Lake zinc resources, the High Lake copper resources, and the Jericho diamond deposit, now Nunavut's first diamond mine.

The signing of the Nunavut Land Claims Agreement in 1993 and the creation of Nunavut in 1999 mean that the Inuit now control a portion of these mineral resources through surface and subsurface land ownership. They are currently owners of the largest block of privately owned mineral lands in Canada, totaling 35,257 km^2 (NTI Overview).

The Inuit of Nunavut will benefit from this land ownership by obtaining revenue through royalties and taxes collected from mines on Inuit-owned subsurface land, and through transfer payments from the Government of Canada for royalties and taxes collected from mines on Inuit-owned surface land. In addition, Inuit will benefit from the Inuit impact benefit agreements (IIBA) signed between mining companies and regional Inuit associations when a mine is built on Inuit-owned land (IOL).

Currently, Nunavut's economy relies heavily on the government. In 1999, government spending accounted for over 55% of the total domestic demand, compared to 22% nationally (Vail and Clinton, 2001). Furthermore, the government employed almost half the total workforce of Nunavut in 1999 (Vail and Clinton, 2001). The territory faces other development challenges because it has the youngest population in Canada, an overall low level of education, and a high level of unemployment.

The Inuit want to develop Nunavut and realize that mining is one way to bring economic prosperity to, and improve the social well-being of, the territory (SEDSG, 2003). Contrary to the past, when exploration and mining companies often ignored their concerns, the Inuit now have the ability to gain from each project. Their concerns lie in how to bring socio-economic development to the region and achieve economic self-sufficiency (NLCA, 1993). One way to ensure that mining brings socio-economic

benefits to the territory is to follow a sustainable development approach whereby mining companies, communities, Inuit organizations, and government work together to maximize the overall economic and social benefits of mining while minimizing the environmental impacts. These benefits include employment, business development, education, capacity building, and training.

Studying past mining operations allows us to understand their impacts on the environment and their economic and social impacts on the people that worked there and lived close by, with the goal of using this information to improve future mining operations to maximize their positive impacts. In Nunavut's case, where there is considerable emphasis on human and economic development, the socio-economic impacts of mining on people living in communities affected by mining are a key part in understanding how to achieve sustainable development in the territory. In the last few years, as discussed below in the literature review, studies reporting specifically on the impacts of mines on communities have become more numerous. However, there is still a need for more studies of this type to be conducted, focusing especially on specific mines, in areas that are geologically important, such as Nunavut.

Looking at past mining operations located close to communities in Nunavut provides a method for understanding how mining can be a part of the sustainable development of the territory. Only two mines fit these criteria in Nunavut: the Nanisivik and Polaris mines.

The Nanisivik and Polaris lead-zinc mines both closed in 2002 after over 20 years of operation. Each mine was located near an Inuit community: Nanisivik, a community-based operation, was connected to Arctic Bay by a 30-km-long road, and Polaris, located 100 km northwest of Resolute, was a fly-in/fly-out operation that used Resolute as a staging point. The differences and similarities of each operation provided a good opportunity to compare their socio-economic impacts on each community.

This study focuses on and compares the economic, social, and employment impacts of the Nanisivik and Polaris mines during operation and after closure, using a qualitative research approach involving interviews with community members in Arctic Bay and Resolute. The objective of the study was to highlight the economic, social, and

employment impacts that community members were aware of, and that made the most important impressions on them. Then, based upon current thinking about sustainable development, these impacts were used to determine if the Nanisivik and Polaris mines represented good examples of sustainable development arising from mining activities. Information gathered about these mines relating to the social and economic impacts of mining, can highlight both the positive and negative aspects of mining in Nunavut. Various stakeholders and landowners, such as companies, communities, governments, and Inuit organizations, can use this information to gain an awareness of the potential impacts of mining operations, and thus place themselves in a position to benefit as much as possible from new operations in Nunavut.

This study is divided into six chapters. In the next section, the main themes of the project are described in order to place the study in the context of current knowledge about mining and sustainable development, and how these themes apply to Nunavut's development. Chapter 3 discusses the methods used during fieldwork and analysis of the data. Chapter 4 presents the results of the research. In Chapter 5, these results are discussed. Finally, Chapter 6 lists the conclusions and the recommendations of the study.

Chapter 2
Literature Review

This chapter reviews the background for this study as well as the relevant literature. First, a brief history of Nunavut, the land claims process, and what mining means in terms of Nunavut's socio-economic development is presented. This is then placed in the context of currently understood sustainable development practices and concepts. A description of the study sites follows.

2.1 A brief history of the Nunavut land claims process

The territory of Nunavut, inaugurated on April 1, 1999, is the culmination of many years of negotiations between the Inuit of Canada's Arctic, who wanted to settle their land claims, and the Government of Canada. In 1973, the Government of Canada presented a first draft for a Comprehensive Land Claims Policy, with the goal of defining, through land claims agreements, the rights and benefits of Aboriginals, and eliminating existing undefined Aboriginal rights (INAC, 2004). This policy, though only in the draft stage at the time, started the land claims process in Canada's north.

The Inuvialuit land claims negotiations, which took place from 1978 to 1984, ended with the signing of the Inuvialuit Final Agreement, the first agreement of this type in Canadian history to grant both surface and subsurface ownership of lands. The Inuvialuit's efforts would help pave the way for the Nunavut Land Claims Agreement (NLCA) that would be signed a little less than ten years later.

In 1982, the Tungavik Federation of Nunavut (TFN) was created to negotiate an Inuit land claims agreement with the federal government. Negotiations over the subsequent ten years permitted the Inuit to negotiate an agreement that would satisfy their desires. In 1990, an Agreement-in-Principle was signed and the final agreement was signed in 1993.

The Inuit aspired to gain some control over what would be the new territory of Nunavut:

> *Through land claim negotiations, we are trying to put in place institutions and processes to plan for and to manage the development and conservation of land, water, wildlife and the offshore; and to ensure that Inuit benefit from resource development. We are seeking a more imaginative settlement of our land claim that will give Inuit a major role in making decisions about development.* (Nunavut 5, 1986, p. 6)

In exchange for loss of aboriginal title to most of their lands, they asked to retain their aboriginal rights as well as obtain a quantum of land where they would have legal title (McPherson, 2003). In addition to this they asked for a system of management boards for control of Inuit or Crown lands in Nunavut. Having control of their land and participating in management boards that control the projects occurring on that land would help the Inuit to more effectively oversee Nunavut's socio-economic development and make this development more sustainable. This study examines the Nanisivik and Polaris mines, which were established and then operated, for the most part, before the signing of the NLCA, a time during which the Inuit had little influence over the issues of socio-economic development and sustainability. Understanding the changes brought about by the NLCA for new mining projects in Nunavut, such as Inuit owned lands and management boards, puts past mining project experiences into context with current practices.

2.2 Inuit Owned Lands

The signing of the AIP led to the final step in the settlement process: land selection. Negotiations would determine which land would become Inuit owned surface land, and within this land, which would become Inuit owned subsurface land. Selecting subsurface land with high mineral potential would allow Inuit to benefit from any mineral resource development, and help them achieve their goal of economic self-sufficiency, as stated in the NLCA under section 17.1.1:

> *The primary purpose of Inuit Owned Lands shall be to provide Inuit with rights in land that promote economic self-sufficiency of Inuit through time, in a manner consistent with Inuit social and cultural needs and aspirations.* (NLCA, 1993)

Geological consultants from Associated Mining Consultants Ltd. and Comaplex Resources assisted the Inuit in choosing land of high mineral potential (McPherson, 2003). The Inuit obtained title to 350,000 km^2 of land, of which 35,257 km^2, or approximately 2% of Nunavut, also include mineral rights (NTI Overview). This essentially made the Inuit the largest private landowners in Canada.

The federal government holds the mineral rights to all the Crown Lands in Nunavut, as well as Inuit owned surface lands. Companies wishing to undertake mineral exploration or mining on these lands pay fees and royalties to the federal government. Those companies wishing to operate on Inuit owned subsurface lands deal directly with Nunavut Tunngavik Incorporated (NTI). This not-for-profit corporation, incorporated in 1993, is the successor to TFN and administers all claim settlement benefits for the Inuit in Nunavut. Mining companies wishing to work on land managed by NTI must follow its rules and regulations and pay fees and/or royalties to it. The minimum annual royalty to be paid by mining companies will be 1.8% of total revenues (Sherlock, 2004). In addition, NTI will receive a portion of all royalties collected on Crown Lands managed by the federal government (NLCA, 1993).

In conjunction with royalties, mining companies wishing to develop mines on IOL will need to sign Inuit impact benefit agreements with the Regional Inuit Association of the Nunavut region where the mine will be. Such agreements will permit the Inuit to negotiate training, hiring, housing, and business opportunities with individual companies operating in their region (NLCA, 1993).

2.3 Nunavut Management Boards

In addition to owning land, the Inuit were given partial control of all Nunavut lands, waters, wildlife, and development through five management boards: the Nunavut Impact Review Board (NIRB), the Nunavut Planning Commission, the Nunavut Water Board, the Nunavut Wildlife Management Board, and the Surface Rights Tribunal. One of the most important of these boards is NIRB, comprised of nine members: four Inuit, two federal government representatives, two territorial government representatives, and one chairperson. NIRB reviews all proposals for projects, such as mines, that are deemed to have potentially negative impacts on the local environment, or potentially negative socio-economic impacts on residents of Nunavut, and prepares a report on each (NLCA, 1993). The NIRB works closely with the federal or territorial minister responsible for approving specific project types. Ultimately, it is the minister and not NIRB that approves projects (NLCA, 1993). The minister's decision is, however, based on the NIRB report. Approval of NIRB reports paves the way for the development of projects in Nunavut (NLCA, 1993).

2.4 Mining and socio-economic development in Nunavut

The Nunavut Land Claims Agreement has given the Inuit a large amount of control over the development of the territory. As discussed above, mining is seen as an important way to develop the territory socially and economically by providing royalty and tax revenues, and by providing jobs, training, and business opportunities for Nunavut firms through Inuit impact benefit agreements.

The idea that mining can be used to develop Nunavut is one that many in Nunavut are taking seriously. For instance, in its *Nunavut Economic Outlook*, the Conference Board of Canada lists mining as one of the best ways to develop Nunavut's economy (Vail and Clinton, 2001). The Nunavut Economic Development Strategy (SEDSG, 2003) also discusses the importance of mining for the development of Nunavut's economy. These reports also emphasize the importance of developing social programs in conjunction with building the economy, in order to be able to gain the maximum socio-economic benefit from mines and other projects. For example, focusing on improved

levels of education, training, health, and community/government capacity alongside economic development programs will create an environment that can maximize sustainable development in Nunavut.

There are several factors, however, that limit the number of mining operations in Nunavut: lack of infrastructure, remoteness of resources from markets and high transportation costs, lack of a skilled labour force, sparse geological information on mineral potential and other resources, and strict and potentially overlapping regulatory requirements (Vail and Clinton, 2001). These issues need to be addressed in order for mining to become an important part of the economy as suggested by the Conference Board of Canada (Vail and Clinton, 2001) and the Sivummut Economic Development Strategy Group (2003).

A concept that has been promoted as an effective way to attain maximum benefit from mining is sustainable development. Sustainable development is mentioned in all aspects of government, mining, NGO, and Inuit organization policies that attempt to tackle the development issues in Nunavut (e.g., SEDSG, 2003; Vail and Clinton, 2001; Government of Canada, 2000).

2.5 Sustainable development

The most widely accepted definition of sustainable development is that presented in the report of the World Commission on Environment and Development (1987), known as the Brundtland Report:

> *Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.* (p. 43)

Until the Brundtland Report, the concept of sustainable development, which grew from the environmental movement of the 1970s, was only an idea in the making. It was not until the United Nations Conference on Environment and Development in Rio de

Janeiro in 1992, that the concept of sustainable development started to be widely used (MMSD, 2002). Since then, sustainable development has gained importance and acceptance while becoming a cornerstone for government planning and corporate strategy.

2.5.1 The pillars of sustainable development

At the Rio conference, the concept of sustainable development was divided into 'three pillars' that indicate areas of particular focus in order for development to be conducted sustainably: economic, social, and environmental (MMSD, 2002). There has been a realization since the Rio conference, however, that the goals of sustainable development cannot be achieved unless the organizations responsible for implementing sustainable development are held accountable for what is accomplished with development funding (Halle, 2002). Without ensuring proper 'governance,' the other pillars of sustainable development cannot be achieved (Halle, 2002; Richards, 2005). Such governance supports representative democracy and participatory decision-making, avoids excessive concentration of power, encourages cooperation, and ensures transparency and accountability (MMSD, 2002).

2.6 Sustainable development and mining

The concept of sustainable development can theoretically apply to all aspects of development. Unfortunately, not all development projects are inherently sustainable. Mining, for example, requires extraction of ore from the ground and once this is done, it cannot be replaced. How can we apply the concepts of sustainable development to a non-sustainable industry? In the case of mining, and other non-renewable resource development projects, the application of sustainable development principles implies that there will not be a waste of the resource, and that the development of the resource will be done in a socially, environmentally, and economically responsible manner (Crowson, 2002; Richards, 2005).

For sustainable development to be realized, four factors need to be addressed: physical capital (infrastructure), human capital (employment, education, health), natural capital (raw material required for economic activity), and social and organizational capital (creation of wealth from interaction between human and physical capital) (Vail and Clinton, 2001). In essence, the mining industry can work on the three pillars of sustainable development by focusing on the mineral resources (natural capital), transforming the natural capital into human skills (human capital), and creating financial and infrastructural benefits (social and physical capital) in communities affected by mining operations (Jackson, 2005).

The mining industry has attempted to address the sustainable development issues that surround mining operations, because many countries and communities throughout the world depend on mining. The potential for job creation, transfer of skills and technology, and local infrastructure and services development are real benefits of mining operations, but will only be enjoyed beyond a mine's production years if there are the incentives and knowledge to turn the investments into development (MMSD, 2002). Accordingly, several organizations have created initiatives, guidelines, and codes of conduct specifically for, or that apply to, mining companies, with the goal of helping the companies become more socially, environmentally, and economically responsible. The following is a list of examples:

- The Whitehorse Mining Initiative[1] was a multi-stakeholder initiative, signed in 1994, to outline a vision for mining in Canada that the signatories agreed to uphold and achieve. The goals outlined cover various topics such as maximizing community benefits from mining, Aboriginal involvement in the mining industry, and Aboriginal land rights.
- The Global Reporting Initiative (GRI)[2], begun in 1997, is a multi-stakeholder process and independent institution that is developing and disseminating globally applicable sustainability reporting guidelines. Companies wishing to report on

[1] http://www.nrcan.gc.ca/mms/pdf/workplis.pdf
[2] http://www.globalreporting.org/

their social, environmental, and economic practices can do so following the guidelines set out by the GRI allowing others to monitor a company's sustainable development performance.

- The Global Mining Initiative (GMI)[3] sought to bring together the mining, metals, and minerals industries, as well as other interested stakeholders to discuss the key sustainable development issues affecting these industries. The GMI initiated and funded the Mining, Minerals, and Sustainable Development Project (MMSD), which culminated in the landmark report *Breaking New Ground*, that reviews the mining and minerals industries from a sustainable development perspective (MMSD, 2002). This was the first project of this nature and included input from the mining industry, governments, international organizations, NGOs, academia, communities, indigenous peoples, civil society, and labour groups (MMSD, 2002).
- The Mineral Policy Research Initiative[4], managed by the International Development Research Centre, works towards increasing the knowledge and understanding of sustainable development and mining, specifically in Latin America and the Caribbean, by undertaking projects that specifically research how sustainable development can be applied to mining in the region.
- The International Council on Mining & Metals Principles[5], created in 2003, was designed for members of this organization as a way to measure their sustainable development performance.
- The Environmental Excellence in Exploration (E3)[6] program, created by the Prospectors and Developers Association of Canada, provides guidelines on how to properly conduct exploration activities. This is of importance because exploration groups are often the first ones to interact with communities and this interaction can set the tone for future dealings with communities.

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[3] http://www.icmm.com/gmi.php
[4] http://www.idrc.ca/en/ev-70315-201-1-DO_TOPIC.html
[5] http://www.icmm.com/icmm_principles.php
[6] http://www.e3mining.com/index.cfm

The MMSD Project was especially important to those working towards applying sustainable development to the mining industry. From 2000 to 2002, workshops were held around the world covering many themes and often conducted through the regional groups of MMSD Australia, MMSD North America, MMSD South America, and MMSD Southern Africa (MMSD, 2002). The recommendations to the MMSD project from MMSD North America are presented in *Towards Change* (MMSD North America, 2002). The recommendation identified as the highest priority is to "Enhance effort to address the legacy of past mining and mineral activities" (MMSD North America, 2002, p. 55). The main reason for this recommendation is the fact that the poor environmental and social record of past mining operations has created a level of distrust in the industry and government (MMSD North America, 2002). This study addresses this recommendation by examining the socio-economic impacts of two closed mines on the communities closest to them.

Numerous papers, books, and reports discuss mining and sustainable development in general terms, and cover a range of topics relevant to this study including economics (Crowson, 2002; IFC, 2000), mine closure (Peck, 2005), social issues (Clark and Clark, 1999), community development (IFC, 2000), corporate social responsibility (Jenkins and Yakovleva, 2006; Habirono, 2001), community relations (Veiga et al., 2001; IFC, 1998; BSR, 2003), and capacity building (Mate, 2001).

This project, however, looks specifically at the socio-economic impacts of mining on two communities in Nunavut from a qualitative perspective, and differs from previous studies because it presents results from interviews with community members that reflect what they believe the impacts of the mines to have been on them. Studies similar to this one take various approaches. In some cases the socio-economic impacts are included as part of larger studies, such as in the work of Aubynn (2003) who presents the community perceptions of mining in western Ghana. In other cases, communities impacted by mines are compared and contrasted, as in this study, to show how different communities in similar situations react to mining (Wilson, 2004; Filer, 2000; Landis, 1997). Similarly, some studies compare the differences in impacts between communities affected by different types of resource industries, like that presented by Machlis et al. (1990). This

type of study allows communities dependent on more than one resource to better understand how to handle the impacts of the various industries operating in their community. More recent studies, such as those by Glauser et al. (2005) and Nel et al. (2003), have begun examining the sustainability of mining projects and the steps taken by governments, communities, and companies to address the development issues of communities impacted by mining. This study does this as well in an effort to use past experiences to improve future outcomes.

Currently, socio-economic impact studies are one of several requirements for the approval of mining projects in Nunavut. These outline the potential socio-economic impacts that mining projects could have on communities in the same area as mines. These assessments reflect the pre-mining socio-economic situation in communities, and so predict impacts; they are available through the Nunavut Impact Review Board[7]. This project differs from these socio-economic impact assessments because it was conducted after mine closure and looks at the impacts of mining over the lifespan of the mine. That is, instead of outlining the potential impacts before operations begin, this study outlines the actual impacts as voiced by community members in interviews after mine closure.

2.7 Description of Study Sites

This study identifies the socio-economic impacts of the Nanisivik and Polaris mines as perceived by the residents of Arctic Bay and Resolute, the nearest respective communities, in order to determine if the Nanisivik and Polaris mines represent good examples of sustainable development arising from mining activities. This section provides a brief history and description of each community and mine.

2.7.1 Arctic Bay

Arctic Bay is located on the northwestern tip of Baffin Island (Figures 1, 2, 3) and has a population of 646 (Statistics Canada, 2005a). Inuit have lived in the area for

[7] http://ftp.nunavut.ca/nirb/

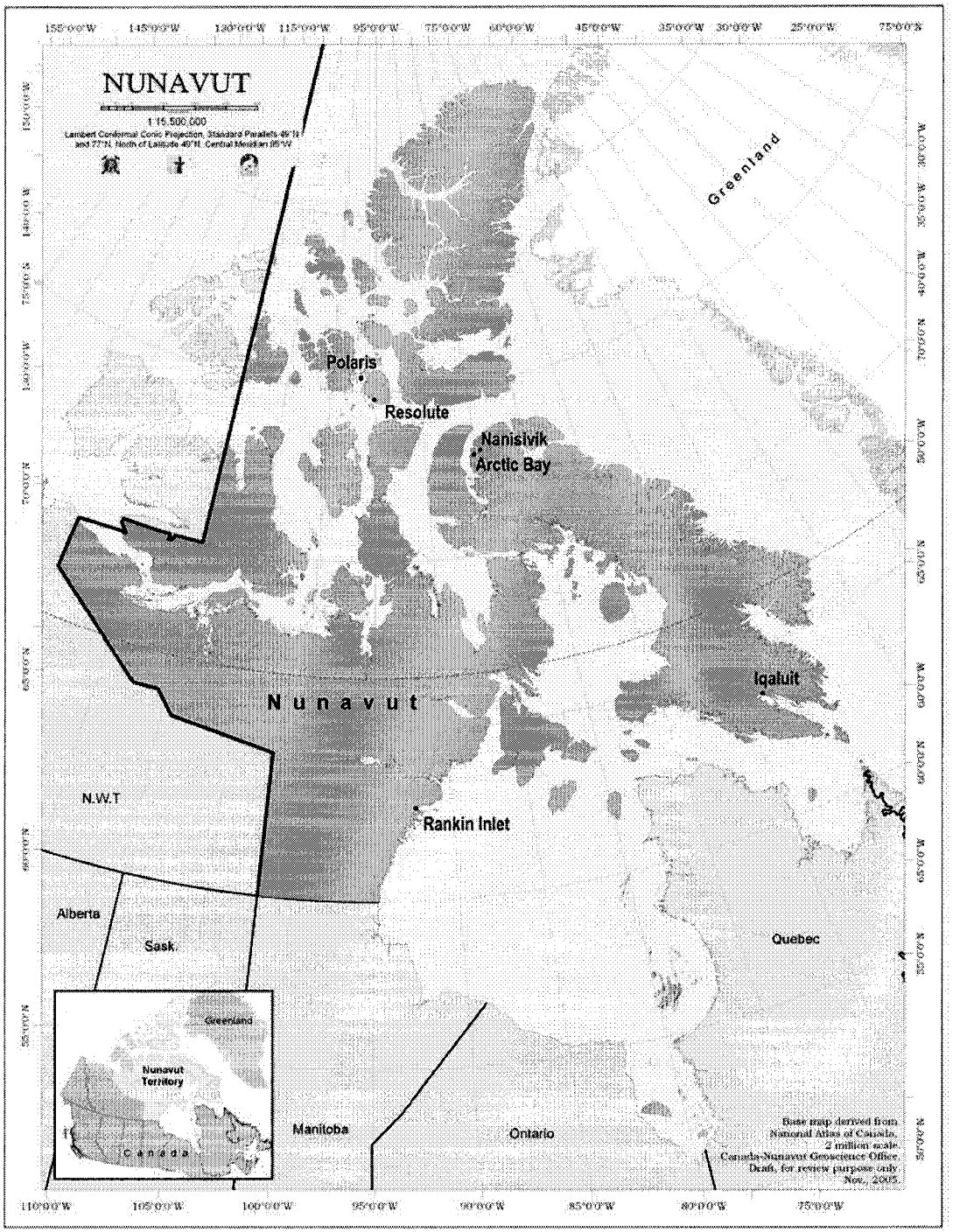

Figure 1 Location of the communities and mines discussed in the text.

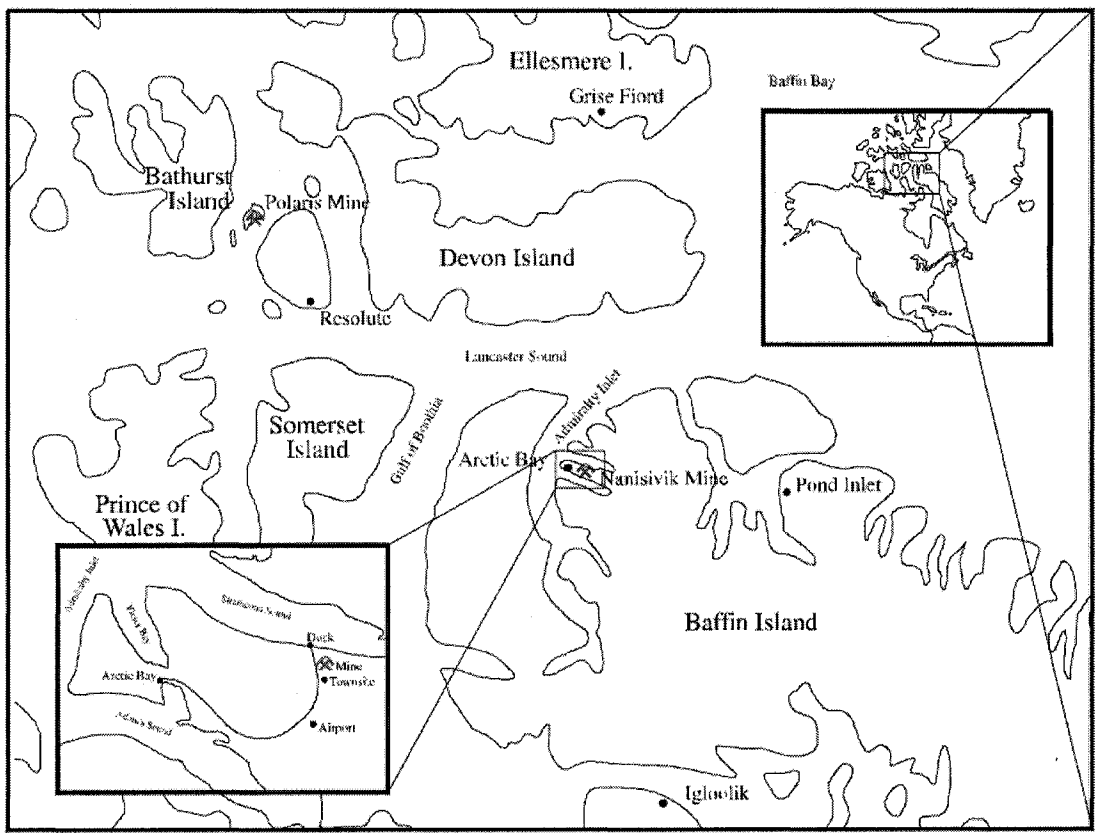

Figure 2 Map showing Nanisivik's location relative to Arctic Bay. From Burns and Doggett (2003).

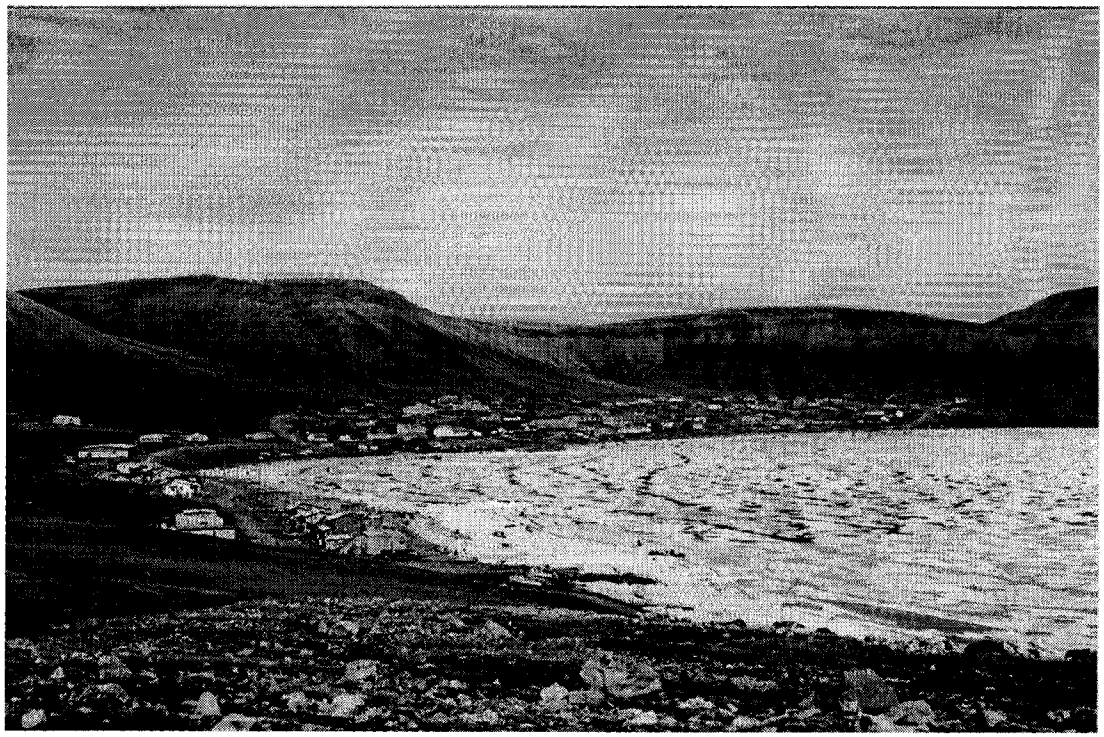

Figure 3 Community of Arctic Bay in July 2004.

hundreds of years, but the present location of the community was first settled in 1926 with the building of a Hudson's Bay Company Post (Bissett, 1968a). This post closed the following year but was reopened in 1936 (Bissett, 1968a). Slowly, Inuit families moved to the site to be close to the trading post and allow their children to attend the school, which opened in 1958 (Bissett, 1968a). To promote community development, Arctic Bay's first Eskimo Community Council was elected in 1967 (Bissett, 1968a).

Since the mid-sixties the community has gained basic services and some business, but remains relatively traditional. About 92% claim Inuktitut as their first language (Statistics Canada, 2005a), and hunting is still a large part of local activities. Similarly to many other northern communities there is a school, a branch of Arctic College, a health centre, an arena, a gymnasium, internet service, and two churches. The community has scheduled air service from Iqaluit on a gravel runway suitable for jets, and built specifically for the Nanisivik mine in the late seventies. Local businesses offer some employment, but many jobs are related to community services offered by the hamlet, or are government related. At the time of this study there were two general stores, of which one was a Co-Op, two contractors, several guides and outfitters, carvers, and a local courier.

2.7.2 Nanisivik mine, 1976-2002

The Nanisivik lead-zinc mine on northwestern Baffin Island (Figures 1, 2, 4) was Canada's first high Arctic mine. It is located 30 km from Arctic Bay. Mineralization near the present location of the mine was discovered by a Government of Canada expedition in 1910. Extensive exploration of the Strathcona Sound area, where Nanisivik would later be developed, was begun by Texas Gulf and Sulfur in 1957, and continued in the following years to define the ore body. Local Inuit from Arctic Bay were hired throughout this period to assist in the exploration work.

By the early seventies, discussions were underway with the Department of Indian and Northern Affairs (DIAND) to prepare for the eventual mining of the deposit. In 1972, the majority ownership of Nanisivik switched over to Mineral Resources International

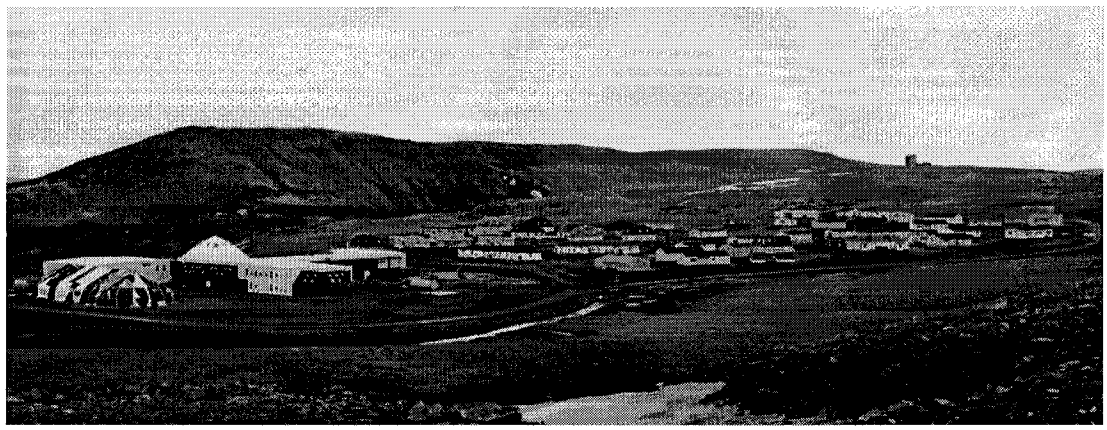

Figure 4 Nanisivik town site in July 2004. The community is in the foreground, while the hill in the background represents the location of the deposit.

The lack of environmental and social impact assessments had previously been an issue with the Department of the Environment, in the autumn of 1973, during the evaluation of the Watts, Griffis and McOuat feasibility study by the working group of the Advisory Committee on Northern Development (Hickling-Partners, 1981). However, the Department of the Environment's concerns do not appear to have been taken into consideration for the signing of the Strathcona Agreement. In fact, the first socio-economic impact study of the mine was conducted in 1979 by the Baffin Region Inuit Association, three years after the start of mine production (BRIA, 1979). This study discusses the socio-economic impacts of the mine, especially with respect to employment at the mine, and gives an overview of some of the emerging social issues related to mine development. Observations made in this study were intended as guidelines for the government and the Nanisivik mine to address problems arising in the early years of operation. The fact that environmental and socio-economic issues were not always taken seriously during these early years, despite being incorporated into the Strathcona Agreement, would later cause important concerns for residents of Arctic Bay, and delay reclamation of Nanisivik, as will be discussed in later chapters.

Production at Nanisivik began in 1976 and ended in 2002, 14 years longer than originally planned, thanks to the continuous extension of reserves. The ownership of the mine changed eight times over its 26-year life (Burns and Doggett, 2003), with Breakwater Resources as the sole owner since 1996. In anticipation of the mine's closure in 2002, a socio-economic impact study was carried out from interviews conducted with community members to outline the mine's legacy and the impacts of closure (Brubacher & Associates, 2002). It is a detailed representation of residents' feelings about the mine and shows results similar to those presented in this thesis. However, because the study was conducted at the time of mine closure, discussions about the impacts of closure are only speculative. Reclamation at the mine site is ongoing as of 2006.

The Nanisivik town site was jointly created by the Government of the Northwest Territories and Nanisivik Mines Ltd. Employees from southern Canada and surrounding Inuit communities moved to the mine site in order to be able to live close to the mine and live with their families at the same time. The community of about 300 had a health

centre, school, community centre with gymnasium and pool, skating rink, post office, RCMP detachment (which doubled as Arctic Bay's RCMP detachment), and a small general store. Inuit workers living in Arctic Bay traveled between Arctic Bay and Nanisivik every day. Most employees would work six days a week for 91 days and then have 21 days off (Storey and Shrimpton, 1989).

Inuit training and employment at Nanisivik was only partially successful because the 60% Inuit employment rate, required by the Strathcona Agreement, was never achieved (McPherson, 2003). The highest rate of Inuit employment was 30% during the construction of the mine (McPherson, 2003). During operation, the highest rate achieved was 28%, and slowly declined over the years (McPherson, 2003). The mine offered on-the-job training to the Inuit in order to give them employment opportunities, but often found that there were not enough Inuit interested in mine employment to fill the positions available to them (McPherson, 2003).

2.7.3 Resolute

Resolute is located on Cornwallis Island (Figures 1 and 5) and has a population of 215 (Statistics Canada, 2005b). It was first settled in 1953 when four Inuit families from Inukjuak, Quebec, and one from Pond Inlet on Baffin Island, were resettled there (Bissett, 1968b). Declining numbers of game in the Inukjuak area caused the Department of Resources and Development and the RCMP to suggest a move to Resolute where there were sufficient resources to support an Inuit community, as well as a weather station and a jet-ready gravel runway to facilitate communication with the isolated community (Bissett, 1968b). The Pond Inlet family was included in the move to assist the Inukjuak Inuit to adjust to their new environment (Bissett, 1968b).

Resolute's location close to areas of oil, mineral, and scientific interests, as well as having scheduled air service from major centres such as Montreal and Edmonton from the mid-sixties onwards, has caused influxes of researchers during summers and of businesses to the community. As of 1994, the community had the highest percentage of businesses per capita (6%) in the Baffin region (Arman, 1997). In addition to various

Figure 5 Resolute in January 2005.

(MRI). In the same year, Watts, Griffis and McOuat began a feasibility study for Nanisivik and submitted their final report in September 1973 (Watts et al., 1973). During this time, a topic of much debate was whether to build a town at the mine site, or build bunkhouse facilities instead (Watts et al., 1973). It was finally decided that for the economic and employment benefits of the mine to be most beneficial to the region, a town should be built at the mine site, with financial assistance from the government (Watts et al., 1973). Throughout this process, communication between MRI, the consultants Watts, Griffis and McOuat, and the federal and territorial governments continued, with sporadic involvement of the Arctic Bay settlement council. Planning for the project involved very little input from Arctic Bay residents, leaving them feeling left out of decision-making (Wojciechowski, 1982). The Arctic Bay settlement council only received a copy of the feasibility study in February 1975, three years after a copy was given to MRI and government officials (Gibson, 1978) and only one year before production began at the mine.

On June 18, 1974, the Strathcona Agreement was signed between DIAND and MRI (Government of Canada and MRI, 1974). This agreement confirmed the support for the project by the federal government. For DIAND, Nanisivik would "provide employment and other socio-economic opportunities for Canadians, particularly those resident in the said Territory, and to obtain information on resource development possibilities in Arctic areas of the Northwest Territories" (Government of Canada and MRI, 1974, p. 1). The agreement also included $16.7 million in grants and loans from the Federal Government for the construction of a town site at Nanisivik, an airport, a 30 km road linking Arctic Bay and Nanisivik, and a deep-sea port. In return for their investment, the agreement stated that the federal government would receive an 18% equity interest in Nanisivik Mines Ltd., the mine would operate for 12 full production years, and the Nanisivik mine workforce would be 60% Inuit by the third year of production. Interestingly, approval for the project was rushed with only three months elapsing between Cabinet's approval of the project on March 28, 1974, and signing of the Master Agreement on June 18 of the same year. Approval for the project was given before major environmental and socio-economic studies were performed (Hickling-Partners, 1981).

services such as a school, a branch of Arctic College, a health centre, a gymnasium, internet service, and a church, there are three hotels, two general contractors, several guides and outfitters, carvers, a Co-Op store, and a regional office for a charter flight company.

2.7.4 Polaris mine, 1982-2002

The Polaris lead-zinc mine, the most northerly in the world, and located 100 km northwest of Resolute on Little Cornwallis Island (Figure 1), was owned by Cominco (now Teck Cominco). Mineralization was encountered in the area in 1960, but the ore deposit that would become Polaris was only discovered in 1971. Development of the property followed, and the mine went into production in 1982. Closure occurred in 2002, and reclamation was finished in 2004.

Although only six years younger than Nanisivik, the Polaris mine was different in most aspects of its operation, from planning to reclamation. Almost ten years before production started, Cominco had already begun visiting local communities that would be the northern points of hire for Polaris (Yellowknife, Resolute, Grise Fjord, Cambridge Bay, Pelly Bay, Spence Bay, and Gjoa Haven). These visits, led by a consultant named J.E. Barrett, were organized to get a better understanding of Inuit culture and to record Inuit impressions about employment at the future mine (Barrett, 1973). Barrett returned four times in 1976 to continue developing a relationship between the mine and the communities visited in 1973 (Barrett, 1976). Both series of visits produced reports detailing reaction of the Inuit to the project, ideas about how best to include the Inuit in the mine's workforce, and whether people would prefer working at a community-based mine or a rotation mine (Barrett, 1973, 1976). In 1980, Outcrop, a consultant group, produced a report commissioned by Cominco, detailing the potential socio-economic impacts of the Polaris mine on Resolute, other surrounding communities, and the Northwest Territories in general (Outcrop, 1980). The report also provided Cominco with recommendations about Inuit employment, community involvement, and local business partnerships (Outcrop, 1980). By the time mining operations had begun, communities

consulted by Cominco appeared to have liked its approach to community consultation (Graham, 1982). In addition to socio-economic studies, Cominco also conducted many environmental studies before starting construction. This is in contrast to Nanisivik, as described above, for which no environmental or socio-economic impact study had been prepared before government approval for the mine was granted. A Letter of Understanding between Cominco and the Government of Canada, signed on February 4, 1980, and a Memorandum of Understanding with the Government of the Northwest Territories signed on August 12, 1981, are Polaris' equivalent to the Strathcona Agreement created for Nanisivik. The Letter of Understanding details the basis for which the project was approved (Graham, 1982), while the Memorandum of Understanding outlines the socio-economic requirements of the project (Cominco and GNWT, 1981).

By 1981, the Government of the Northwest Territories' policy was to discourage the construction of new communities dependent on one resource (Hickling-Partners Inc., 1981). Though Cominco contemplated the possibility of developing a community at the mine site (e.g. Barrett, 1973), it eventually developed Polaris as a fly-in/fly-out operation. All personnel and equipment flown to the mine site first arrived in Resolute via jet, and were subsequently transferred to a Twin Otter airplane for the short trip to the mine site. Southern Canadian employees worked a 63-day shift with 28 days off (Storey and Shrimpton, 1989). Inuit workers had a choice to work this same rotation or a shorter one of 42 days with 28 days off (Storey and Shrimpton, 1989), giving them more time for traditional pursuits. Due to the frequent flights between Polaris and Resolute, Inuit workers from Resolute were also given the opportunity to go home for periods ranging from a few hours to overnight, four weeks into their eight-week rotation.

Unlike the Strathcona Agreement for Nanisivik, the Memorandum of Understanding between the Government of the Northwest Territories and Cominco did not specify the Inuit employment rate to be achieved during the mine's life (Cominco and GNWT, 1981). The Outcrop report (1980) claimed that a workforce with 20-40% Inuit from surrounding communities could be attained by 1985. At the peak of the mine operations, however, the mine employed less than 30 Inuit, representing less than 10% of the total Polaris workforce (Di Menna, 2004).

Chapter 3
Methodology

3.1 Theoretical approach

Studying the socio-economic impacts of mining on communities can be done using quantitative and/or qualitative research methods. In quantitative research, numerical data is collected in order to test a theory (Bryman, 2001). Qualitative research, on the other hand, uses non-numerical data, such as observations and interviews, to generate theory (Bryman, 2001), and allows researchers to understand the different experiences and opinions that people have with respect to a particular situation (Winchester, 2000). In studying the impacts of mining on the communities, understanding residents' experiences and opinions is important because they are the ones that are experiencing the impacts. Numerical data about economic and social impacts are often used to generalize information and do not necessarily make it possible to understand an individual's experiences (Erlandson, 1993). For these reasons, a qualitative research approach was used for this study, rather than a quantitative approach.

3.2 Data collection

There were two stages of fieldwork conducted for this study. The first stage was conducted over a two-week period in the summer of 2004. The principal goal of this fieldwork was to gather background information from members of each community to help with the identification of the important issues relating to the impacts of the mines. This information was used to prepare the interview schedule for the second stage of fieldwork.

The second stage of fieldwork was conducted over a four-week period in January and February 2005, with two weeks spent in each community. Informants were chosen by using purposive and directed sampling, which allows the researcher to select "information-rich" cases that help with identifying the themes important to the study

(Erlandson et al., 1993; Patton, 1990). This sampling method does not require large numbers of interviews, but rather only as many interviews as are necessary to get the best and most in-depth information to help answer the study's questions (Erlandson et al., 1993). Each informant was drawn from one of eight categories created from the information gathered during the first stage of fieldwork: mine employees, mine employee family members, businesses, elders, community members/leaders, nurses, RCMP officers, and school officials. Mine employees were interviewed in the greatest numbers because they were knowledgeable about mine employment and the mines' impacts on them and their families. Businesses and elders were interviewed in large numbers as well because the businesses had important information about the economic impacts of the mines and the elders had lived in the communities for the duration of the mine projects and so were in a good position to discuss changes in the communities due to the mines. Interviews in the other categories reflected the smaller numbers of total potential informants. Table 1 shows the distribution of participants for each interview category for Arctic Bay and Resolute.

The interviews included two main parts. The first part, which was similar for all interviews, gathered demographic information from each informant to be used to create a profile of the people interviewed. The second part sought information about each informant's perceptions of the impacts of the mines on topics such as education, mine employee family circumstances, community-mine relationships, communities' economic conditions, and future mining scenarios. A semi-structured interview format was used. This format consists in using an interview schedule as a guideline to the interviewer, while providing the freedom to vary the order of questioning (Bryman, 2001). This type of interview is similar to a regular conversation with the questions seeking answers for the study, but asked in an order that flows with the conversation and comes out naturally (Erlandson et al., 1993). Interviews were conducted in the language of choice of the informants. When Inuktitut was chosen, one of three interpreters assisted with the interview by translating questions, listening to responses, and translating them back into English. A complete list of questions is provided in Appendix 1.

	Resolute Bay	Arctic Bay
Mine employees	7	9
Businesses	5	4
Elders	4	4
Mine employee family members	0	4
Community members/leaders	2	4
Nurses	1	2
RCMP	1	1
School Officials	2	1
Total	22	29
Total population in 2001	215	645

Table 1 Distribution of participants for each interview category for Arctic Bay and Resolute.

3.3 Data analysis

The author transcribed the interviews once fieldwork was finished, and then analyzed them using NVivo, a qualitative research analysis software. The analysis began with the creation of a series of nodes that represent the various themes to be explored in the analysis. These themes are based on the topics covered in the interviews listed above and in Appendix 1. Each interview was then coded, which consisted of assigning specific parts of each interview to the appropriate node, or theme. The nodes, consisting of interview parts, were then queried, making it possible for all similar interview parts to be read together, allowing the author to compare and contrast the interviews for each community.

3.4 Ethics

The project received ethics approval from the University of Alberta's Arts, Science & Law Research Ethics Board (Appendix 2). Participants were given a letter of introduction at the start of each interview, as well as a letter outlining the interview process (Appendix 3), both of which were written in English and Inuktitut. These letters were necessary to ensure that the informants were aware of the goals of the project and of what the interview process consisted. Their informed consent was then obtained, recorded with their signature, before proceeding with the interview (Bryman, 2001). The informants were assured confidentiality. During analysis, a code was used instead of informants' names, in order to maintain each informant's confidentiality. Any quotes reproduced in this paper use this code as well.

Chapter 4
Results

The following section presents the economic, social, and mine employment impacts of the Nanisivik and Polaris mines on the communities of Arctic Bay and Resolute.

4.1 Economic impacts

The economic impacts of the Nanisivik and Polaris Mines presented here reflect the three principal areas of economic impacts on the communities of Arctic Bay and Resolute: employment income, jet service, and business.

4.1.1 Employment income

Employment income from work at Nanisivik and Polaris is one of the three most important economic impacts of these mines on the communities of Arctic Bay and Resolute. Mine employees living in Arctic Bay and Resolute contributed to their community's total personal income during the operation of both mines. In Arctic Bay, for example, income from work at the mines added $1 million annually to the total personal income of the community (Brubacher & Associates, 2002).

In general, employment income increased mine employees' disposable income, generally benefiting the employees themselves as well as their immediate families. Occasionally, mine employees also shared portions of their income with extended family members. In this way, the benefits of employment income reached many more in the community than just the mine employees.

Mine salaries increased the standard of living for mine employees and their families living in the communities. Some employees bought houses or went traveling out of the communities. The local general stores experienced increased sales in expensive items, such as furniture and appliances, due to the employment income from the mine.

Grocery sales were also higher, as were sales of hunting equipment, especially snowmobiles. The increase in sales at the general stores also meant additional employment was available at the stores for community members.

The closure of the mines, however, has meant a substantially reduced income for mine employees, except for the few working on the ongoing reclamation of Nanisivik. The loss of income has had important effects on the general stores in the communities, mainly in the form of a substantial decline in sales due to the overall reduced disposable income of the communities. The financial adjustment for mine employees and their families has also been difficult, especially for those who have not been able to gain other employment, effectively reducing their ability to purchase groceries and household items:

> *"It's a big adjustment too for people. (...) You're used to bringing home 15 hundred dollars every two weeks (...) 3000 dollars a month, now all of a sudden you get 300 a month. What a kick in the head." B1A*

4.1.2 Jet service

Air service to Arctic communities is an integral part of Arctic life. Most small communities in the Arctic are served principally by turbo prop aircraft. A few, such as Iqaluit, Rankin Inlet, and Cambridge Bay have regular jet service. Resolute has a runway where jets are able to land and this runway has been in the community since the late forties. Arctic Bay, on the other hand, only received jet service with the construction of the Nanisivik airport, built for the Nanisivik mine. It is located 21 km by gravel road from Arctic Bay. The presence of the Nanisivik and Polaris mines increased the frequency of jet flights to both Arctic Bay and Resolute, allowing these small communities to have jet service when they would not otherwise.

When interviews were conducted in January 2005, jet service to the communities was still available, but at a reduced rate compared to before the mines closed. It was rumoured that jet service would be cut, and it was in fact terminated in November of 2005. In addition to losing jet service, residents of Arctic Bay will lose the Nanisivik

airport. The closure of the airport is due to the high cost associated with maintaining the site so far from Arctic Bay. A new airport is planned and will be built closer to the community but it will not be able to accommodate jet aircraft.

Jet service was beneficial to both communities by allowing residents to benefit from cheaper airfare and airfreight costs, direct flights to southern cities, and cheaper and more abundant fresh produce deliveries than surrounding communities that did not have jet service. The benefits extended to local businesses, because of the lower cost for airfreight, and to the local artist and tourism industries because of the cheaper airfares that promoted tourism in those areas.

To residents of Arctic Bay and Resolute, the potential loss of jet service to their communities would affect all aspects of their daily lives by increasing airfare and airfreight, grocery bills, and the cost of purchasing supplies needed by local businesses. In Resolute, for example, residents had already noticed an increase in airfare and airfreight costs since Canadian North, one of two carriers servicing the community, stopped flying to Resolute in 1999. Prices again increased after the mine closed in 2002. The complete elimination of jet service, to be replaced by turbo prop aircraft, could lead to even higher airfare and airfreight costs.

The loss of jet service could also have a major impact on the tourism industry. With increased airfare costs, fewer tourists will likely choose to fly to either community. Business owners involved in Resolute's tourism sector have already seen a decline in visitors passing through the community. The airport gift shop has seen a 50% reduction in sales. A decline in visitors could mean a loss of community employment and the eventual closing of some of the hotels.

4.1.3 Business

The impact of the mines on Arctic Bay's and Resolute's local business communities is dependent on the relationship the mines had with these businesses, and the nature of the business environment before the opening of the mines.

In Arctic Bay, where few businesses existed before the construction of Nanisivik, several local entrepreneurs took advantage of the presence of the mine to open businesses. A local Inuk man discussed opportunities with the Nanisivik mine and negotiated a contract to run the employee shuttle service between Arctic Bay and Nanisivik. He also negotiated a janitorial contract with the Government of the Northwest Territories to clean the government buildings in the community at Nanisivik.

The location of the Nanisivik airport, 21 km from Arctic Bay, created the need for a taxi service to shuttle travelers from the airport to Arctic Bay. This business changed hands throughout the years, but was most recently operated by the same Inuk man that operated the mine employee shuttle service. Another entrepreneur started a courier service to haul freight from the airport to Arctic Bay. These businesses provided employment for approximately one to four people per business for Arctic Bay residents, jobs that would not otherwise have existed.

In Resolute, on the other hand, several businesses were established in the community before the construction of Polaris. Although no new businesses were created because of Polaris, several of the existing businesses negotiated contracts with the mine, including flight, cargo handling, and accommodation contracts.

The closing of the mines has affected each business differently. The Inuk entrepreneur in Arctic Bay has diversified his business over the years and has since started a heavy equipment operation and a hotel. Therefore although the employee shuttle and the janitorial services are no longer needed and he has lost revenue since the mine has closed, he has developed other services to continue his business. The taxi service he owned and operated had the potential of being adversely affected by the termination of jet service. The increased weekly frequency of flights into Arctic Bay by a smaller turbo prop aircraft would create a need for more frequent taxi trips. This, coupled with the high cost of fuel in the North, would decrease overall revenues because there would be no increase in the weekly number of passengers using his taxi. Since interviews were conducted, and the jet service was terminated, the taxi service has since been stopped because it was no longer profitable, showing that the owner's fears were correct. The owner of the courier service did not think that the loss of jet service would affect his

business very much because freight will continue to come into Arctic Bay. He will most likely have to make some scheduling changes, because he will have to go to the airport several times a week instead of two.

The closure of Nanisivik benefited a local contracting business, which was in charge of retrofitting five houses moved from Nanisivik to Arctic Bay. The business hired as many local workers for the job as possible, needing to call upon only two outside contractors during the project. Many of the workers on this contract had been previously employed at the Nanisivik mine.

In Resolute, all the businesses that had contracts with the mine continued to operate after the closure of Polaris, but suffered a loss of revenue and some loss of employment after Polaris's closure. They were all established in Resolute before Polaris opened and offer various services, allowing them more easily to adjust to the loss of their contract with the mine than would businesses that offered only one service.

4.2 Social impacts

The social impacts of the mine are presented here in four categories: quality of life, alcohol usage, education, and expectations. In general, the social impacts of the Nanisivik and Polaris mines on the communities of Arctic Bay and Resolute vary based on the distance of each mine to the community closest to it. In Arctic Bay, where there is a road link with the mine, there were more extensive social impacts than in Resolute where there was no road link with the mine.

4.2.1 Quality of life

The mines had a considerable impact on quality of life for many of the residents of Arctic Bay and Resolute, mainly through an improvement in the standard of living for mine employees and their families, as well as for others in the communities. The increase in standard of living stems principally from high mine salaries and low cost freight, both allowing families to purchase household items and hunting equipment needed to pursue

traditional activities (e.g. snowmobiles and boats), which would otherwise have been too expensive. Purchasing such items was made even cheaper for the Nanisivik mine employees, who benefited from a monthly freight allowance. The allowance gave them, their family members, and friends they wished to share their allowance with access to receiving freight on the Nanisivik re-supply ships at a fraction of the cost of regular shipping rates. A community member who was not an employee of Nanisivik, but whose nephew was, stated:

> *"(...) just to give you an example, for a boat, my nephew, he bought (...) a 24 footer boat and for him to bring it (...) up here he paid 250 dollars and for me to (...) ship it up here would cost me 8000 to 13000 dollars." C3A*

Many in the community appreciated this increase in quality of life. There were, however, some who found it difficult to adjust to the fact that family members were no longer at home as often as before they started working at the mine.

The presence of the jet service, required to maintain the operation of the mines, also reduced the cost of living for residents in both communities. The jets, which other small communities in the Arctic of similar size did not have, made traveling outside the communities to visit family members elsewhere, or to go on vacation, more affordable. The quality of fresh produce was also improved and its cost reduced due to jet service.

The mines also provided all households with Christmas gift baskets. Furthermore, many residents appreciated that employment at the mines permitted local residents to learn the requirements of having a job, and to provide for their families:

> *"(...) being able to provide for your family and being able to have a sense of self-esteem, a job, and a purpose — I really think that's the essence of what this mine has done for the community." R1R*

Arctic Bay residents felt that their community benefited from the facilities at the Nanisivik community centre, which included a pool, gymnasium, and restaurant, giving

them the opportunity for alternative family activities not possible in Arctic Bay. Arctic Bay and Nanisivik also assisted each other with community services when needed, as with fire fighting or with the use of the water truck if one broke down.

In Resolute, residents appreciated the donation of excess mine materials while the mine was operating, such as building materials for the community's use, and most agreed that an important benefit of the mine was the help it afforded hunters passing through the area. If hunters were running low on fuel, or needed repairs or medical help and were near the mine, they could ask for assistance, sometimes even obtaining accommodation. Many also used the mine as a navigation aid when traveling in the dark.

It appears that the closure of the Nanisivik and Polaris mines has not yet caused any major social impacts on Arctic Bay and Resolute residents. Most people, however, were worried about the increase in costs of living, now that there are no more mine jobs, and the increased cost of air travel to and from their communities. The low number of available jobs in the communities, coupled with lower salaries, means that many who were accustomed to higher paycheques from their employment at the mines have had to adjust to their new lifestyles.

4.2.3 Alcohol use

Alcohol consumption was permitted at both the Nanisivik and Polaris mines. In Nanisivik, alcohol could be ordered without restrictions. At Polaris, there were weekly pub nights and employees were free to consume alcohol in their rooms. These situations differ greatly from those of Arctic Bay and Resolute where a permit, granted by the local alcohol committee, is required for every alcohol purchase.

Problems with alcohol that stem from the presence of the mines were most prevalent in Arctic Bay and Nanisivik. The road linking the two communities made it easy for Arctic Bay residents to obtain alcohol in Nanisivik. It was also possible for Nanisivik residents to order alcohol at a reduced cost because of the cheaper shipping freight costs available to Nanisivik employees, as discussed above. These situations led to some drunk-driving incidents between Arctic Bay and Nanisivik, as well as difficulties

for Inuit employees who were late or missed work shifts and subsequently lost jobs because of alcohol:

> *"I lost my job due to alcohol and drinking too much and not showing up (...) for work 'cause of the night before. That was a big factor up there for a lot of (...) Inuit employees, because alcohol abuse was pretty rampant among Inuit workers up there." W8A*

Many Arctic Bay residents were disappointed by the fact that alcohol was freely available in Nanisivik, and suggested that more Inuit might have worked at the mine, and for longer, if alcohol had not been so easily available at the mine.

In Resolute, alcohol issues related to the mine did not appear to have been as prevalent as in Arctic Bay, mainly because few mine employees came into contact with community residents, and so the possibility of residents obtaining alcohol from workers was minimal. There were nonetheless problems with alcohol for Inuit employees at Polaris, causing some to be late for or to miss shifts. Being away from home for extended periods of time and making substantial amounts of money meant that many also consumed a large quantity of alcohol once home after the end of their rotation.

4.2.3 Education

Both the Nanisivik and Polaris mines provided funding for the construction of a gymnasium in their respective communities, donated money to the community schools, and provided scholarships for students. According to school officials, the high school graduation rates were not affected by the presence of the mines, and no students pursued an education in mine-related fields. Although mine officials visited the schools on a sporadic basis, and some children had the opportunity to visit the mines each year, there was little interaction between the mines and the schools, and few children understood the purpose of the mines or knew what they were.

The differences between the school in Nanisivik, built for mine employees' children, and the school in Arctic Bay reveal that indirectly, however, Nanisivik did have an impact on the education in the area. The school in Nanisivik had a mix of children with parents from southern Canada and parents of Inuit descent. The Nanisivik school had stronger discipline, more stringent homework requirements, and a higher level of English instruction than the school in Arctic Bay. Inuit children who attended the Nanisivik school and then the Arctic Bay school, once their parents moved back to the community, found the discipline to be laxer in Arctic Bay, and generally did better in school, especially in English, than their peers who had only attended the Arctic Bay school. Though the Nanisivik students did poorly in Inuktitut classes, their overall grades and motivation about school were generally higher than the Arctic Bay students. The consequence of this difference between schools has been that former Inuit students of the Nanisivik schools still tend to have better jobs in Arctic Bay, likely due to their higher level of English and the fact that they are more accustomed to working with southern Canadians:

> *"We seem to get better jobs compared to them and that's what I don't like 'cause it's only half an hour away and it was such a big difference (...)."*
> *F3A*

4.2.4 Expectations

There were no large industrial operations in the region surrounding Arctic Bay and Resolute before the construction of the Nanisivik and Polaris mines. As the first large industrial operations in the region, the expectations of residents were high, especially in Arctic Bay where community residents felt an attachment to the mine because it was close by. One of the highest expectations was that of employment for local residents. With that also came the expectation of consultation and community involvement with the mines. As the years went by, other expectations also developed, such as the donation of

mine infrastructure to the communities when the mines closed, and consultation about mine reclamation.

Residents of both Arctic Bay and Resolute expected that community members would be hired to work at the mines. Though local residents did work at both mines, the percentage of Inuit employees remained quite low at both mines (a maximum of 30% at Nanisivik and 10% at Polaris). This was disappointing to residents, especially those of Arctic Bay where the Strathcona Agreement had stated that there would be a 60% Inuit work force at the mine after the third year of production. The government of the Northwest Territories, the federal government, and MRI set up a Training and Employment Advisory Committee that was to meet monthly to review the progress in the employment objectives listed in the Strathcona Agreement. These objectives principally consisted of finding ways to ensure that as many Inuit as possible could be trained and hired for employment at Nanisivik. The committee met for the first few years after Nanisivik was approved but eventually stopped meeting. Many in Arctic Bay felt that the employment and training committees did not do enough to improve the employment situation of Arctic Bay residents, and that had more attention been paid to the agreement, more Inuit would have been employed at the mine.

Residents felt that, in terms of direct interaction with the mines, they were not treated fairly in Arctic Bay's case, or taken seriously in Resolute's case. Both mines met with each community's hamlet council on a semi-regular basis, and were available for meetings when the councils wanted them to attend. However, despite these efforts, residents felt left out of decision-making. This is true of both communities, but more so in Arctic Bay where residents felt that Nanisivik was a more prominent presence in their daily lives than Polaris was for residents of Resolute. Arctic Bay residents wanted an active part in decision-making about the Nanisivik mine because it was so close to their community. Though both mines informed the hamlet councils of mine management decisions with potential impact on communities, there were few forums for residents to voice their concerns or discuss mine plans with the mine management. Many wished that they had more of a say:

"I just wish that they consulted with the community and the elders especially during the operation of the mine. Things I think would have gone a lot better if they worked closely together with the elders and the community." F3A

During mine reclamation, community residents expected that each mine would donate some infrastructure to the community. Many felt that this would improve the overall quality of their community by providing, for example, houses and building materials. This, however, did not happen, disappointing many residents who also felt that the reclamation consultation process was poorly done.

The Nanisivik community reclamation was to be done by Breakwater Resources, the owners of the mine. An effort was made by the Government of Nunavut, in partnership with the federal government, the mine, Arctic Bay, and regulatory bodies, to determine what to do with the infrastructure at Nanisivik (GN, 2002). Public hearings were organized by the Government of Nunavut to ask residents of Arctic Bay what they thought should be done to the houses and community centre in Nanisivik. Many residents wanted some of the houses to be moved to Arctic Bay to alleviate their housing shortage and others suggested that the facilities of the community centre be converted into a training school, or left for the use of Arctic Bay residents because there is no community centre in the town. Ten houses had already been moved from Nanisivik to Arctic Bay, where they had been retrofitted and made available to community members before the closing of the mine. As a result, residents had expected more homes to be moved. However, a long period elapsed between the closure of the mine in 2002 and a decision about what to do with the buildings. A public hearing, organized by the Government of Nunavut, was held in Arctic Bay in June 2004, and many perceived it to be a consultative meeting to determine the fate of the houses in Nanisivik. However, by the time that a second meeting was held in February 2005, also perceived to be consultative meeting, the government announced that no more houses would be moved to Arctic Bay and the entire town site at Nanisivik would be torn down. At the time of the February 2005 meeting, the houses were already being taken down. That the suggestions they had made at the first

meeting were not acted upon was disappointing to residents. Had discussions and plans been undertaken earlier in the reclamation process, or earlier during the operation of the mine, many felt that the reclamation of the houses and community centre could have been completed with less uncertainty for residents, and in a more timely manner.

One of the reasons for the decision not to move houses to Arctic Bay or to keep the community centre at Nanisivik was apparently the level of contamination of the buildings. From conversations with Arctic Bay residents, it was clear that many of them, including an official on the socio-economic sub-committee, a committee created to assess the best way to minimize the socio-economic impacts of mine closure on Arctic Bay, did not understand what the contamination was. This reflects a lack of communication between territorial government officials (who had the report explaining the contamination) and community residents, and is the cause for some distrust of the territorial government amongst community members.

The reclamation process in Resolute was undertaken more expeditiously due to the lack of a community at Polaris and the distance between the mine and Resolute. Residents said the community had been promised infrastructure but never received it, which led to some disappointment. However, although individual residents may not have received anything, both the school and the hamlet received office furniture, and the Arctic College campus received books, for which these organizations were grateful. The local RCMP detachment also obtained some of the mine's gym equipment after Polaris' closure, and had since set up a small workout facility and training program for the youth of Resolute.

4.3 Employment Impacts

The Nanisivik and Polaris mines offered mining employment to the Inuit in Arctic Bay and Resolute for the first time. Understanding the experiences of mine employees from the two communities will help with the planning of new mines in Nunavut by providing mining companies with an insight into how Inuit with mine work experience

view mine employment. Three topics will be discussed: training and employment, income, and work environment.

4.3.1 Training and employment

The majority of male Inuit employees at both Nanisivik and Polaris were labourers, whereas most female Inuit employees worked as housekeepers or cleaning staff. Both jobs required minimal education and little training. The labourers often worked seasonally during the summer shipping season. Those employees working year round generally worked as heavy equipment operators, after having received on-the-job training. A few Inuit employees at Nanisivik, who showed special interest and worked well at the mine, were trained for other skilled jobs, such as heavy equipment mechanic, electrician, carpenter, and plumber.

Unfortunately, it appears that few Inuit had the opportunity to obtain official certification for training received on the job, including training for both trades tickets and heavy equipment operator licenses. Although many of the mine employees interviewed were able to work as tradesmen or heavy equipment operators at the mines, they did not receive the appropriate certification while working at the mines that would allow them to work elsewhere in Nunavut.

4.3.2 Income

The main reason for residents of Arctic Bay and Resolute to work at the mines was money. The salaries from mine work were substantially higher than for other jobs available in the communities and made the work more appealing, especially for those from Resolute who were away from their families for extended periods.

Workers in both communities spent their salaries in similar ways. Workers used their salaries to support their immediate families first, followed by their extended family if they chose to. Some of the workers bought houses, and many bought household items,

hunting equipment, vacations to southern Canada, and the male employees, in particular, spent portions of their salaries on alcohol and partying.

4.3.3 Work environment

The work environment at Nanisivik and Polaris, coupled with employee motivation, dictated whether Inuit employees worked for an extended period at the mines. Over the years, many Inuit worked at the mines for short periods of time, but relatively few worked there for more than a couple of years because many did not enjoy mine work. Many Inuit workers worked as labourers because this job requires little training, little commitment, and there are always jobs available. Another reason why many mine employees did not work for extended periods of time was due to the fact that the Inuit enjoy spending time on the land; therefore, in the spring when the Inuit would traditionally go hunting, many would quit.

The employees that worked on a more permanent basis enjoyed their jobs because they learned new skills, and their jobs kept them busy. For Inuit workers living in Nanisivik, the advantages of their mine job made working there more appealing. They paid low rent on their home, they had a shipping allowance, and their children could attend a good school.

Another factor in job satisfaction was the mine work schedule. Though both mines had vastly different work schedules, thirteen weeks on and three weeks off for Nanisivik employees, and six or eight weeks on and four weeks off for Polaris employees, the mine employees in both communities were satisfied with their work schedules and believed that their time off provided ample time for hunting, participating in traditional pursuits, and spending time with family.

Nanisivik employees, who generally worked 12-hour shifts, enjoyed the fact that they could see their families every day. For those employees living in Nanisivik, working this demanding schedule was made easier by the fact that, while they worked, their children were taken care of at the mine's local daycare centre, allowing both parents to work if they chose.

Polaris employees had the choice of which schedule to work, the six-week rotation that allowed them to pursue their lifestyle (Outcrop, 1980), or the eight-week rotation that southern Canadians worked. Many opted for the longer rotation, despite the fact that they disliked being away from home, because they made more money. The employees from Resolute who worked the eight-week rotation took advantage of the frequent flights between Polaris and Resolute to fly home for an evening or week-end at the halfway point of their eight-week rotation, making their extended period of time away from home more bearable.

The Inuit and southern Canadians worked together at the mines and appeared to generally get along well. Conflicts arose more often between the Inuit and their bosses than with co-workers, because the bosses were the decision makers. Some of the conflicts arose because of the southern Canadian employees' poor understanding of the Inuit culture. The Inuit thought that it was most important, however, for their bosses to understand their culture because they were the ones making work-related decisions. Preconceived notions about the Inuit culture made it harder for friendships to form between the Inuit and southern Canadians. Language was also often a barrier in communication in the formation of friendships between the Inuit, who commonly speak Inuktitut and little English, and southern Canadians, who do not speak Inuktitut. Workers generally managed to settle differences and solve problems by finding ways to understand each other. The Inuit workers with better English found it easier to communicate, get to know, and work out problems with southern Canadians. The differences in culture and some of the difficulties in communication between the Inuit and southern Canadian workers, however, led to a lack of trust in the abilities of the Inuit at Nanisivik on the part of some southern Canadians, who then tended to over-supervise them and give them fewer responsibilities at work.

There were other aspects that Inuit employees did not enjoy about work at the Nanisivik and Polaris mines. Many of the employees disliked working underground and chose to work with a surface crew if they could. There are several reasons for this, mainly that some were claustrophobic, but for others, because they would be buried underground

when they died, being underground while alive put them ill at ease. Only a handful of Inuit employees worked underground regularly, principally at Nanisivik.

4.4 Residents' suggestions for future mining in Nunavut

Arctic Bay and Resolute residents are in a unique position in Nunavut because they have experienced what it is like to have mining operations close to their communities. Their suggestions about how to improve mining, drawn from their experiences, are extremely useful to mining companies, government, and community councils for the planning and development of future mining operations in Nunavut. The following sub-sections describe residents' suggestions for future mining with respect to the economy, community development, and employment.

4.4.1 Economic development of Nunavut from mining

Residents in Arctic Bay and Resolute thought mining was a good way to develop Nunavut's economy, but agreed that the actual benefits depend on how projects are developed. Business owners were the most positive about the benefits of mining for Nunavut's economy. Businesses of all sizes saw potential opportunities to create partnerships with mines. Some of them also saw mining as the catalyst needed to start up more small community-based businesses. For this to happen, however, it was suggested that business training had to be provided because many Inuit currently wanting to start a business have a poor understanding of how to run one. Business training is especially important in Nunavut where the challenges of starting and running a business are numerous, and without the proper knowledge many entrepreneurs give up in the early stages of their start-up.

Community members had greater reservations about the economic benefits of mining. This is especially true for Arctic Bay residents, who were not pleased with their relationship with Nanisivik and the impacts it had on their community. Many thought of mining only as a temporary benefit, and that after closure communities are left

unsupported. There was a worry amongst interview participants that small community businesses will see harder times after mine closure, and that these community businesses might not survive without the benefits that a nearby mine can bring. There was also a worry that the money raised from mining will go to the government or Inuit organizations and not reach the residents of communities affected by mining:

> *"It's good for the government but not for the people. We never get our fair share." C2R*

If a portion of the funds raised through royalties and taxes is spent within Nunavut on training, job creation, business creation assistance, and on the communities affected by mining, residents thought that mining would be beneficial to Nunavut's economy.

4.4.2 Community relations and social development due to mining in Nunavut

The relationship between mining companies and the communities, from which they draw employees, or which they impact in some way, needs to be healthy. Arctic Bay residents have many suggestions in this respect because of their relationship with Nanisivik, which was not always positive. Resolute residents, on the other hand, had fewer suggestions because of their weaker relationship with Polaris. This is despite the fact that Polaris drew employees from Resolute and impacted the lives of its residents. The relationship between each mine and its respective community was not considered to be very good, and both mines could have made a more concerted effort to involve the community in decision-making.

From their experience, residents stated that good communication between all the stakeholders is the most important step in creating a successful relationship. Communities need to be aware of the implications of having a mine operation in their region, and to understand what their roles and responsibilities are in the relationship. If agreements are signed with respect to the mining operation, these must be adhered to by all those who sign them. Being involved in the planning process of the mine, especially if the mine is

going to be close to a community, is also an important aspect for communities. This planning needs to take into account community concerns and wishes.

The planning process is important because, for Arctic Bay residents, many of the problems that arose with Nanisivik, such as the reclamation of the town site at Nanisivik, could have been mitigated had better mine planning been undertaken. Residents suggested that mine planning should take into account the entire life of the mine, from construction to the end of reclamation, in order to avoid hasty decision making when milestones in a mine's life are achieved. Part of the planning process also involves the continuity of a project. Should the ownership of a mine change hands, or key mine employees leave, the appropriate steps need to be taken to ensure that agreements made with previous owners are honoured by subsequent owners, and that new employees receive accumulated information about the mine from their predecessors so that ideas are not lost.

Mine planning will also need to take into account the fact that new mines in Nunavut will most often be located far away from existing communities and that no new communities will be built at mine sites, like was done at Nanisivik. Few communities in Nunavut have experience with rotation work. Residents of Resolute, who are used to rotation work because of Polaris, were more open to the idea of having family members working away from home but, importantly, would prefer to have family members work within the community if possible. Mining companies face potential employee recruitment problems in communities where people are not used to rotation work, such as in Arctic Bay, because people prefer to work within their community in order to remain close to their family. Residents of in Arctic Bay, who are used to community-based mining, were less open to the idea of rotation work than in Resolute. For many, rotation work means distancing themselves from their lifestyle, and extensive periods of time away from their families.

In order to have a positive relationship with communities, mining companies will have to work hard to include residents in their operations. One method for doing this is to be involved in educating the public about mining through mine–community partnerships. The majority of interviewees in both Arctic Bay and Resolute were not able to explain

what happens at a mine. In communities where mining is providing income and employment, residents should have a basic understanding of the mining process. This is important because fear of the unknown often makes it difficult for people to make balanced decisions. Knowing more about the mining process, therefore, can make it easier for mining companies and communities to communicate and cooperate. Providing tours for community members and explaining the mining process would be an excellent way of inciting interest in a mine that is affecting a community. Involving children in this process is another way to promote understanding about mining. School officials in both communities suggested that a closer relationships between mines and schools would help prepare younger generations for possible mine work. School visits that explain the mining process and the jobs that are available, job shadowing, summer employment, and scholarships are some ways that school officials believe mines can be more involved in the community.

4.4.3 Training and employment at future Nunavut mines

Residents of Arctic Bay and Resolute agreed that mining employment would be good for communities because it would bring much needed training, employment, income, and experience to those working at the mines. Though there are currently few possibilities for employment at Nunavut mines, it appears that former mine employees from both communities would be willing to do mine-related work when other mines open. Nanisivik and Polaris employees currently form part of a small percentage of residents of Nunavut who have the necessary qualifications and experience to work at mine sites in positions more complicated than as general labourers. Some former Nanisivik employees have already shown a willingness to work at other mine sites by going to work at Polaris during its reclamation.

Much needs to be done before Inuit can be hired for mine employment in larger numbers than seen at Nanisivik and Polaris. Training was seen as the key to readying the population for mine work. The perception was that without training, Inuit would be overlooked when mines open, and that few would get jobs. For training to be most

effective, it has to be provided before mines open so that Inuit can be hired from the onset of mine construction. On-going training during mine operation was also seen as important for developing a competent work force, but it could not be the only method of training because it would not create enough opportunities for employment of local people. Training Inuit in preparation for mine work, on-the-job training, and certification of on-the-job training are three ways that could maximize Inuit employment, and could also lead to training for supervisory and management positions.

One way of providing the appropriate training is for the government and mining companies to share some of the costs of educating the workforce:

> *"(...) we have to educate, and we have to train, and we have to provide the role models, and we have to provide the careers. And if the big companies are there, they should certainly subsidize that because if they're getting any profit then it's incumbent upon them to also subsidize the future." S1R*

Royalties and taxes collected from mining operations could also be used to invest in the education of residents of Nunavut. Partially industry-funded trades schools combined with on-the-job training would provide the best opportunity to employ as many Inuit in Nunavut mining operations as possible. Residents in both communities would like to see Inuit hired first for work at Nunavut mines before workers from southern Canada, and Inuit living in the region of a mine should be hired preferentially over Inuit from other regions of Nunavut.

While Inuit employment at Nunavut mines will be achieved with more training, residents stressed the importance of addressing the aspects of mining that could limit the number of Inuit working in Nunavut mining operations. Aspects that residents would like to see addressed are the poor mastery of English of some Inuit, the separation from family required for mine jobs, and the limited lifespan of mines.

Chapter 5
Discussion

The concepts of sustainable development that are being applied to the mining industry today were not being applied to the industry when Nanisivik and Polaris began production. The following sections discuss the Nanisivik and Polaris mines' three major areas of socio-economic impact and relate these to current sustainable development practices, with special emphasis on how mining can promote sustainable development in Nunavut.

5.1 Economics

In the *Nunavut Economic Outlook*, prepared by the Conference Board of Canada (Vail and Clinton, 2001), mining is seen as Nunavut's largest wealth creating industry and, for this reason, is a major component of the 20-year economic forecast for the territory described in the report. The authors predicted that a minimum of four new mines would open in Nunavut before 2012 and that these would provide more than $110 million in real GDP per year to Nunavut's economy for the duration of the forecast. The report warns, however, that little of this money will directly benefit Nunavummiut (residents of Nunavut) unless more are hired to work at the mines and mines purchase more goods and services from Inuit-owned businesses.

In general, the positive impacts of the mining industry are felt through GDP growth, direct and indirect export and tax revenues, direct employment, indirect economic spin-offs, direct contribution to community services (such as health, education, transportation, water supply services, energy, information and telecommunication, and small businesses and vendors), and supplier partnership programs (Ericsson and Noras, 2005). Overall, GDP growth has the largest impact on Nunavut's economy. Direct employment, indirect economic spin-offs, supplier partnership programs, and direct contributions to community services, however, impact Nunavummiut more directly. Hiring greater numbers of local workers and contributing to local communities will

therefore allow the economic contributions of mining companies to reach Nunavummiut more fully (Vail and Clinton, 2001).

Resolute and Arctic Bay's experiences with mining show that this is true. In both communities, mine employee salaries were considered one of the most important economic impacts of the mines. The mines' indirect economic spin-offs also benefited local residents, especially because of the jet service and increased sales at the local general stores. The majority of the mines' spending, however, was not local because they purchased their supplies from southern Canada and had contracts with companies based there. In order for more economic benefits to have accrued to these communities, more Inuit should have been hired for work at the mines and the companies should have participated more actively in the development of the communities' economies. Community economic development can be achieved by training Nunavummiut in business management, through micro-enterprise and supplier development programs (IFC, 2000).

In micro-enterprise development programs, companies work with communities to help them develop businesses that answer the specific needs of a mining company, such as catering, cleaning, and construction services (IFC, 2000). This type of program can create mining-dependent businesses, however, and so an effort must be made to make sure that these businesses search for other markets (IFC, 2000), or diversify their services, so that they can continue to operate once mines close. Though no such programs existed in Arctic Bay or Resolute, the employee shuttle service to Nanisivik exemplifies one business owner's success in creating a business used by the Nanisivik mine. The owner created a service which the mine could use, but diversified his business to include other services so that once the mine stopped operating and the shuttle service was no longer needed he could stay in business.

Supplier development programs, also known as preferential procurement policies (MMSD, 2002), are similar to the micro-enterprise development programs, but instead work with or help create businesses that can obtain contracts to supply a company with goods or services on a larger scale (IFC, 2000). These programs work towards ensuring that purchasing policies for mines exist, that upcoming contracts are available early so

that local businesses have time to prepare a bid, that local businesses have the resources available to make their bids competitive, and that they can learn from the process (IFC, 2000). This type of program does not appear to have been used at either Nanisivik or Polaris during their operation, but is currently being used to a certain extent in Nunavut. The Government of Nunavut has a procurement policy that gives Nunavut and Inuit firms advantages in contract bids. Furthermore, the *Nunavut Economic Development Strategy* lists preferential procurement policies as a goal for the development of the territory's economy (SEDSG, 2003). Mining companies are also participating in these programs because of commitments made in Inuit impact benefit agreements (IIBA) signed between companies and Regional Inuit Associations. The Tahera Corporation, owner of the newly opened Jericho diamond mine, signed such an agreement with the Kitikmeot Inuit Association (see Tahera and KIA, 2004).

In the past few years, several Nunavut and Inuit firms have begun taking advantage of the procurement policies and are succeeding in creating partnerships with mining companies, notably the diamond industry. Nuna Logistics, which is a certified Inuit firm, is one of the largest. It has worked at all the major diamond mines such as Ekati, Diavik and Jericho. Another example is the Qikiqtaaluk Corporation, which had a contract to work on the reclamation of the Polaris mine.

5.2 Social development

With the signing of the Nunavut Land Claims Agreement, the Inuit of Nunavut now have more control over the development of mining projects than they had in the past. This is principally due to the creation of the Nunavut Impact Review Board (NIRB), which reviews all development projects that are deemed to have potentially negative environmental and socio-economic impacts (NLCA, 1993). Companies wishing to develop projects that have potential negative impacts must prepare an impact statement for NIRB as a first step to receiving approval for their project. Each statement must contain specific information about the project including: the environmental and socio-economic impacts of the project, the contingency plans that will mitigate adverse

impacts, the plans for optimization of the benefits of the project, and the monitoring program that will be established (NLCA, 1993).

This development project review process, however, was not in place at the time of the Nanisivik and Polaris approvals. In fact, the Nanisivik mine was approved before environmental and socio-economic impact studies were performed. The Polaris mine had conducted environmental and socio-economic studies before approval, but these were not reviewed to the same extent as is required currently in Nunavut. The results of these approvals, given with little or no thought to the impacts on Arctic Bay and Resolute, have resulted in a missed opportunity to reduce the negative impacts and to take advantage of the potential benefits created by the mines located close to the communities.

Social impact assessments (SIA) (and socio-economic impact assessments) often emphasize the ways in which negative impacts of a mining project can be avoided or mitigated (Gibson, 2000). If the social impact assessments of mining projects are to be used in conjunction with the principles of sustainable development, however, there must also be a focus on the long-term benefits of the projects; thus, social impact assessments must also take into account the positive and potentially long lasting benefits of projects (e.g. O'Faircheallaigh, 1999; Gibson, 2000; Joyce and MacFarlane, 2001). In addition, indigenous communities would like to share in these benefits (Holden and O'Faircheallaigh, 1995, cited in O'Faircheallaigh, 1999). The NIRB requirements for impact statements take these considerations into account, because impact statements must describe contingency plans aimed at mitigating the potentially negative impacts of the project, and they must also describe the plans designed to ensure the optimization of the project benefits for communities.

The Outcrop report, *Potential socio-economic impacts of the Polaris Mine Project*, mentions that cultural changes brought on by mine development need to be managed in order for the residents of Resolute to benefit (Outcrop, 1980, p. iii). To this effect, recommendations were made in an attempt to address the potential socio-economic impacts that Polaris could have on Resolute. In Nanisivik's case there was no socio-economic impact assessment done before approval, but the Strathcona Agreement did require that the mine address certain economic, social, and employment impacts that

Nanisivik would have on Arctic Bay such as providing appropriate upgrading courses for Inuit employees, and investigating and solving social problems that would arise from the operation (see below). What is interesting about these two cases is that despite recommendations made in a social impact assessment in Polaris' case, and despite legal requirements in Nanisivik's case, steps to mitigate the potential negative impacts and to maximize the potential positive benefits were not taken. These cases are good examples of the fact that, in general, there has been a failure to integrate social impact assessments into decision-making (O'Fairchellaigh, 1999).

For socio-economic impact assessment findings to influence the decision-making of project development and operation, the findings need to be integrated into legally binding agreements (O'Fairchellaigh, 1999) and monitored. Inuit impact benefit agreements are the legally binding agreements that specifically outline what will be done to mitigate the negative socio-economic impacts of a mining project and, more importantly, what will be done to maximize the positive impacts. In addition to the Inuit impact benefit agreements, monitoring programs outlined in the impact statement also serve as a way of addressing the socio-economic impacts of a project.

Importantly, ongoing mining activities can be improved by revisiting impact assessments (Joyce and MacFarlane, 2001) because not all mining impacts, socio-economic or environmental, for example, can be predicted in impact assessments performed before mines begin construction (O'Fairchellaigh, 1999). Furthermore, certain factors, such as people's values and government policies, change over time and could undermine the validity of data and assumptions used to create the original study (Geisler, 1993). Moreover, community consultation is also one of the most important steps in gaining regulatory approval for mining projects and should be the earliest step in creating development programs, because it raises community awareness of the project's impacts and allows for agreement on management and technical approaches in order to maximize the benefits and reduce the negative consequences of a project (IFC, 1998). Accordingly, it is necessary to engage in community consultation during the preparation and revisitation of impact assessments, in order to create assessments that integrate the values and expectations of the community both with government policies and with the goals of

the mining project. Such assessments would better predict possible impacts and make the direction of the project more adaptable to unforeseen circumstances.

Regrettably, in the cases of the Nanisivik and Polaris mines, not only were impact assessments prior to mine construction nonexistent or minimal as described above, the community consultation processes were also minimal compared to what is expected today; this is reflected in the number of comments made in interviews by residents who felt left out of the planning processes of the mines. For example, the issue of alcohol in Nanisivik details both why socio-economic impact assessments need to be revisited *and* why community consultation should be a key component of both the initial and revisited assessments. The mine decided that alcohol would be available without restriction at Nanisivik, despite the fact that alcohol is restricted in Arctic Bay. It was apparent from interviews, however, that Arctic Bay residents made use of the road linking the mine to the community to gain access to alcohol in Nanisivik, effectively bypassing Arctic Bay's attempts at controlling alcohol consumption. Interviews also revealed that the mine policy to allow alcohol without restrictions at Nanisivik bothered many Arctic Bay residents. Had Nanisivik performed a socio-economic impact assessment and consulted with community members before approval, there is the possibility that the issue of alcohol could have been addressed before problems began. Nevertheless, even if alcohol had not been addressed in the initial assessment, revisiting the assessment could have brought this issue to light, and steps could have been taken early on to either change the alcohol policy at Nanisivik by aligning it with that of Arctic Bay, or alcohol addiction treatment services could have been provided for those wanting help for themselves or others. This example demonstrates good reasons for revisiting socio-economic impact assessments and talking to residents regularly during mine operation. Due diligence investigations should also be performed after project approval to ensure that socio-economic assessments are accurate (Joyce and MacFarlane, 2001).

Recently, examples of the environmental impact statements required by NIRB have been produced by the Tahera Diamond Corporation, Miramar Hope Bay Limited, and Cumberland Resources. The mines that these companies will develop will provide Nunavut with its first opportunity to apply the NLCA guidelines that give the Inuit a

greater control over the resources in the territory. The Jericho diamond mine, owned by Tahera, is the first mine to operate under these socio-economic and environmental guidelines and will provide an important example by showing if mining and sustainable development can be combined in Nunavut. This is important because small communities, like Arctic Bay and Resolute, have few resources to properly develop social programs or build needed community infrastructure without assistance. An effective way for mining companies to assist communities in achieving this is to participate in community development programs by creating partnerships with communities, governments, and NGOs operating in the area around the mine. These organizations can work together to tackle regional and local social development issues. The most important principles for good partnerships are to clearly define the partnership objectives from the outset, remain flexible throughout the partnership, and ensure that all organizations strongly support the partnership (IFC, 2000). It appears that there were no such partnerships between the mines and the communities of Arctic Bay and Resolute. The mines provided scholarships for students and donated money to the schools, for example, but there do not appear to have been longer lasting partnerships established during the lifespan of the mines that could have worked to improve school activities, community health, business knowledge, alcohol awareness, and general community capacity. These are all areas where both Resolute and Arctic Bay could have benefited. Again, many of these issues are now being addressed in the impact statements required by NIRB, as well as in Inuit impact benefit agreements.

5.3 Training and employment

Job creation at new mining projects is one of the best contributions mining can make towards sustainable development, and should be seen as an opportunity for communities to develop residents' skills (MMSD, 2002). The following section discusses how mining employment can benefit communities in Nunavut.

Both the Nanisivik and Polaris mines had relatively few Inuit employees throughout their years of operation. The low levels of education, training, and work

experience of the local residents during mine operation made it difficult for the Nanisivik and Polaris mines to hire higher numbers of local residents. This continues to be a problem today for mining, as well as other industries in Nunavut, and will limit Nunavut's opportunities to develop the territory if not addressed (Vail and Clinton, 2001).

The mines trained employees on the job, but few Inuit had the opportunity to obtain training in trades through apprenticeships. Those who received apprenticeship training had to spend part of their training at schools in other provinces or territories for months at a time, a situation with which few Inuit felt comfortable, and which caused some apprentices to drop out of their apprenticeships. It is possible that, had training schools been available in another Inuit community instead of in the south, more Inuit apprentices would have been successful in finishing their training and more would have been trained. Having a trade school in Nunavut would go a long way towards helping with the training of a workforce capable of performing mine work. In February 2006, the Government of Nunavut announced funding for a trade school in Rankin Inlet (Figure 1) with an opening date of 2009 (GN, 2006). This trade school should help to address some of the employment issues facing Nunavummiut, and increase the number able to work at mines.

Though having a trade school in Nunavut will be useful, mining companies will still have to be proactive in training Nunavummiut. Although the training of Inuit was not entirely successful at the Nanisivik and Polaris mines, mainly due to the low numbers of Inuit employees hired to work there, it is possible to train successfully and employ high percentages of aboriginal employees who have little or no previous experience with mine work. Currently, several mines in the North are having success in recruiting, training, and employing Aboriginals, including Inuit, as described below. Their success appears to come from their flexibility in hiring local employees, providing significant training at the mines and in surrounding communities, and providing Inuit with the opportunity to work in a wide range of jobs, including management positions, something not done at Nanisivik and Polaris. Furthermore, these new mines have signed agreements with Inuit organizations stating training responsibilities and hiring targets.

The Red Dog mine, located in northwestern Alaska and opened in 1989, is owned by Teck Cominco. In an agreement with the Northwest Alaska Native Association (NANA), Teck Cominco agreed that 100% of the workers at the mine would be NANA shareholders (mainly Inupiat Eskimos that live in the area of the mine) by the twelfth year of operation. In 1993, only four years after start of production, 45% of Red Dog mine employees were NANA shareholders and another 6% were working in mine related enterprises (McLean and Hensley, 1994). By 2001, 62% of the employees were NANA shareholders (Werniuk, 2001). Though the number of NANA shareholders employed at Red Dog has still not reached 100%, both NANA and Teck Cominco continue to train new employees to reach the target.

The diamond mines of the Northwest Territories have also made great efforts to hire as many local people as possible for their operations. The Diavik mine, for example, signed a Socio-economic Monitoring Agreement in 1999 with the Government of the Northwest Territories that was ratified by five aboriginal groups, including the Kitikmeot Inuit Association. This agreement stated that 66% of employees would be northern residents, and of this, 40% would be aboriginal (DDMI, 2004). In 2004, 70% of employees at the mine were northern and 38% were aboriginal (DDMI, 2004). The mine has made training available at many different levels through community partnerships (where almost 250 graduates are now trade helpers and apprentices who have since been hired for work at the mine; DDMI, 2004), scholarships, mine site training, and employee development (DDMI, 2003).

The experience that people gain while working at mining operations such as the ones described above, can be used for work in other parts of the local economy (MMSD, 2002). This has happened to a certain degree in Arctic Bay and Resolute, where the skills that mine employees gained on the job have enabled them to obtain other work in their communities. It is important, however, to show community residents how the skills obtained from mine work can be useful for future work. Two ways that mining companies can do this is by setting up mentoring programs for young community members, and offering courses to community members at large (MMSD, 2002). These types of program can create an interest in mine jobs and provide some preparation for

mine work. Unfortunately, such programs did not exist in Artic Bay or Resolute. There was little interaction between the schools and the mines, and little interaction between adults in the communities and the mines. Most children and adults had a poor understanding of mine processes or what it was like to work at the mines as a result.

It is currently not possible to know how much change has actually occurred in Nunavut in terms of hiring practices and training within the mining industry, because since the creation of Nunavut, only the Jericho mine has opened and it is still too soon to know how well training and employment will develop. Similar to the procurement policies discussed above, IIBAs will help ensure that Inuit are hired and trained at mines in Nunavut. In the Jericho mine IIBA, it was agreed that a 60% Inuit employment target within the fifth year of operation would be reached (Tahera and KIA, 2004). Considering Nunavut's small population, the Jericho mine will have to work hard to achieve this target, but if both Red Dog and Diavik are succeeding, then it should be possible at Jericho. Ultimately, the success of training and employment efforts will depend on the continued commitments of mining companies, communities, governments, and individuals.

Chapter 6
Conclusions and recommendations

The purpose of this study was to determine the socio-economic impacts of the Nanisivik and Polaris mines on the communities of Arctic Bay and Resolute, respectively, using qualitative research methods. Discussing community residents' impressions of how the mines impacted their lives over the course of the mines' operations can help mining companies, communities, governments, NGOs, and Inuit organizations maximize the benefits of mines for Nunavut in the coming years. Three main areas of impact were studied: the economic impacts, the social impacts, and the employment impacts.

The economies of both communities were improved by the presence of the mines and the jet service that accompanied them. Mine employee salaries were a major economic impact because they had the largest impact on individuals and their families, and were the cause of increased sales at the general stores. A few new local businesses were created, and some existing businesses had contracts with the mines. However, since mine closure and termination of jet service, businesses have lost revenue, and some have stopped operating. The mines had few social impacts or benefits because they had a low level of interaction with the communities. The major social impact of the mines was increased alcohol usage in the communities, which in Arctic Bay was due primarily to the road linking the community to the Nanisivik mine, whereas the most important benefit of the mines was the increased level of education available at the Nanisivik school. The lack of interaction between mines and communities, however, disappointed many residents because it meant they were rarely consulted and were left out of decision-making about the projects. The mines provided employment for some Inuit from Arctic Bay and Resolute, but were never able to achieve more than 30% Inuit employees. The Inuit who worked at the mines gained new skills but often did not receive proper certification for their training. Nevertheless, some have been able to use their skills in other work since mine closure and have the experience to obtain work at Nunavut's new mines.

The Nanisivik and Polaris mines do not provide good examples of the application of sustainable development principles to mining projects because the benefits that the mines brought to the communities did not persist after mine closure, and minimal efforts were made to maximize or capitalize on those benefits. For example, there was little or no attention paid to producing socio-economic impact assessments before approval for the mines was given; few of the new businesses created since mine construction have lasted after mine closure; and there was a poor integration of education, training, and employment, reducing the number of people who could gain employment at the mines.

At the time when Nanisivik and Polaris began production, the Inuit had no control over the approval process for mining projects. Their principal method of control was through community consultation organized by the companies or the government. The suggestions made by residents during the consultations were, however, not always taken into consideration in company decision-making, leaving Arctic Bay and Resolute residents to follow company or government decisions made about the development of the mines. Had the companies and the government worked more closely with each other, and with Arctic Bay and Resolute residents, the development of the mines could have been done in a way that would have increased the positive social and economic impacts, and would have had a more lasting positive impact on the development of the communities. As it stands, it is almost as if the mines had never existed, so few are the lasting positive or negative impacts of the mines.

For the communities to have benefited more fully from the operations and for the development to have been more sustainable, there should have been better cooperation among all stakeholders. Furthermore, the mining companies and the government should have focused on transforming the mineral resource into opportunities for developing human skills and financial and infrastructural benefits in the communities (Jackson, 2005). Fortunately, with the signing of the Nunavut Land Claims Agreement (NLCA), the approach to mining in Nunavut has become more aligned with the principles of sustainable development. Through the NLCA, the Inuit have more control over decisions made about each mining project, they stand to benefit from royalties collected for mining on Inuit owned land, and they will be able to create more lasting benefits for communities

through Inuit impact benefit agreements. Of course, the benefits of mining operations will only endure if knowledge is applied to turn the investments into long-term sustainable development (MMSD, 2002). Because Nunavut is young and only one new mine has opened since its creation, it is not yet possible to determine if mining will actually help with the development of the territory.

6.1 Recommendations

Following the above conclusions, some recommendations can be made to ensure that mining has as many positive benefits as possible in Nunavut in the future. Many of these recommendations are already being implemented, at least in part, but it is nevertheless important to reaffirm the following sustainability-oriented proposals.

1. Steps must be taken to teach business skills to Nunavummiut in order to increase the number of Inuit-owned and -operated businesses. Entrepreneurs can take advantage of the presence of mines to start businesses, to expand their businesses, and/or to create partnerships with them. To this end, mining companies can join with the Government of Nunavut to create courses geared to teaching business skills. Alternatively, mining companies can create their own courses and participate more directly in community activities.

2. An effective community consultation/participation mechanism needs to be achieved so that communities affected by mining have the opportunity to actively participate in mine-related decisions that have the potential of affecting the community. In this case, public involvement should be more participatory, because as was evident in both Arctic Bay and Resolute, residents felt they did not have enough opportunity to talk with mining companies, nor did they feel their suggestions had any impact. Mining companies need to become more open to the idea of including community input into mine decision-making. Communication will create trust between communities and mining companies

3. In order for as many Nunavummiut as possible to be employed by future Nunavut mines, it is important to ensure that training opportunities are numerous and varied. Mining companies need to train workers on the job and provide certification, allowing the employees to improve their skills and move up in position. Mining companies should also participate in educating people outside of the work environment through the sponsoring of community-based educational activities and schools dedicated to training people for work. Training will make people readily employable as soon as they are needed. The advantage of this is that less on-the-job training will be needed and more Nunavummiut will be hired from the start of mine construction and production, opening up the possibility for on-the-job training of other Nunavummiut.

4. Mining companies need to plan their operations from start to finish before any construction begins to take place. These plans need to be explained to surrounding communities. A dialogue must continue with the communities throughout the mine's life, and appropriate changes must be made to the mine plan to ensure that reclamation goes smoothly. Steps must be taken to ensure that communities affected by mining are prepared for closure. From the planning stages of an operation until closure, stakeholder roles and responsibilities need to be clearly defined and responsibilities must be acted upon.

5. Mining companies should participate more openly in elementary and high school activities. Because there are many different jobs available at mines, one of the best ways for mining companies to be involved in community development in Nunavut is to teach children about the job opportunities available to them. This can be done through career days, visits to the mine, summer employment, and job shadowing. Other ways mining companies can assist children is by helping to coordinate after-school activities, or participating in the building of a community centre that gives children a place to go. Furthermore, increasing the level of teaching in Nunavut schools would go a long way to improve employment chances of Nunavummiut at a time when good reading skills and

mathematics are required for many jobs at mines. Many mining jobs today require the ability to read complex instruction manuals and operate highly mechanized equipment.

6. In order for mining companies to have a better relationship with communities, there should be a good flow of information to the communities about the operations, with opportunities for feedback and involvement in decision-making. In addition to this, information about how the mining processes work should be made available to the community. This can be done through information sessions, distribution of pamphlets, interviews on the radio, and visits to the mine facility. Taking these steps will help communities better understand the mining process.

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Appendix A Structured and semi-structured interview questions

Structured interview questions

The questions in this section are general in nature and provide a background for each participant.

What is your name? (Not to be recorded on voice recorder, name is noted for record, participant is assigned a code, which is used to keep anonymity.)

How old are you?

Where were you born? Resolute/Arctic Bay/Nanisivik/somewhere else

For the participant born in Resolute/Arctic Bay/Nanisivik

- How long have you lived in Resolute/Arctic Bay/Nanisivik?
- Have you lived anywhere else? If yes: Where? For how long?
- Why did you go live there?

For the participants not born in Resolute/Arctic Bay/Nanisivik:

- When did you move to Resolute/Arctic Bay/Nanisivik?
- Where did you move from?
- Why did you move to this community?

Where is your family from?

Have you travelled anywhere other than here?
If yes: Where have you gone?
How long do you usually go away for?

Up to what level of school have you finished?
Where did you go to school?
Have you done any courses through the Arctic College? If yes: Which ones?
Have you taken any training courses for a specific job? If yes: Which ones?

What is your work history? (Jobs, duration of each)

What language do you speak at home?
How comfortable are you speaking English? (for non-native English speakers)
Would your comfort level in English affect which jobs you would apply for?
How comfortable are you speaking Inuktitut? (for non-native Inuktitut speakers)
Would your comfort level in Inuktitut affect which jobs you would apply for?

For Inuit residents only:

- Who did you live with when you were growing up?
- Who was the main provider for the family? (Father/Uncle/Brother/Mother…)
- Did they work to provide for the household?
- If yes: What was their work?
- If no: How did they support the family?

- Do you hunt?
- How often do you hunt?
- What do you like to hunt the most?
- How far do you go to hunt?
- Do you hunt alone or with others?
- If you hunt with others, whom do you go with? Family? Friends?
- Did you hunt when the mines were in operation?

- Who was the family's provider while mine was in operation?
- How often did you eat country food when the mine was in operation?
- How often do you eat country foods now?
- Has the amount of country foods you eat since the mine closure changes?

Tell me about mining and how mining companies operate.

What is your interest in my project?

Semi-structured interview question

The questions in this section are specific to each category of participants (see Table 1). There are two types of questions. The first series of questions can be considered an extension of the structured interview. They are specific in nature to each particular group and provide additional background for each participant, specific to their relationship to the mine. Other questions, such as those in the 'Opinions of mining' section are open-ended and serve as a starting point for discussions. Questions on the following pages were not necessarily asked in the order presented here. In general, questions were asked in an order appropriate to the direction in which the interview was going.

Questions for miners:

Work history:

- How long did you work at the mine? From what year to what year? Continuously or on occasion?
- What were your job and/or jobs at the mine?
- What was your work schedule?
- Did you work on rotation?
- What was your rotation schedule at the mine?
- How did the schedule work for you?
- How would you improve it? What schedule would you like to see?

Experiences at work:

- What was your experience working at the mine?
- What made you enjoy your work?
- What made you dislike your work?
- Would you work at a mine again? Why/Why not?
- Did you have enough time off?
- Did you get along with the southern Canadian workers?
- Did you ever have any conflicts with the southern Canadians? If yes: What were they?
- Do you think the southern Canadian workers and bosses understand the Inuit culture?

Training and job position:

- Did you receive training for the work you did? If so, what kind? If not, do you think you should have had training? Why/Why not?
- Did you move up in your job position? Why/Why not?
- Did the company offer you any opportunities to work underground?
- Would you have liked to work underground? Why/Why not?
- Did your salary change while you were working at the mine?
- To your knowledge, was your salary the same as the salary of a southern Canadian doing the same job?

Family situation:

- Why did you choose to work at the mine? The experience, the money, to support your family, etc?
- Do you support anyone? Family, extended family, friends?
- Did your work help support more people? (The reason for this question is to get an idea of support network which is much different than for other Canadians)
- Who did you live with while you were working?
- Who do you live with now?
- For Arctic Bay residents only: Did you live in Nanisivik or did you stay in Arctic Bay and why did you make that decision?
- How did you deal with the separation from your family while you were working?
- What are you telling your children about the possibilities available for people who work at the mine?

Current situation:

- What do you do now that the mine is closed?
- Do you have a job now? If so, what is it? If not, why not?
- How has your salary changed since you have stopped working at the mine?
- Did you get your job because of the experience you gained while working at the mine?

Opinions of mining:

- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?
- Would you go away to work at a mine if it meant that you could provide for your family?
- Would you rather work on rotation or at a community?
- I was told that many of the Inuit working at the mine were heavy equipment operators. Why do you think Inuit do not want to work underground?
- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- What can/do communities fall back on once mining leaves the area?

Questions for business owners:

Business history:

- What is your business's name? What does it do?
- How long has your business been in operation?
- Where did you get the skills to run a business? School, experience, partner, short courses?
- When the mines were in operation, did you do any business with them? If so, of what type?
- How has your business been doing without the business of the mine?
- If you never did business with the mine, has the mine closure affected you any way? In what way?
- Have you noticed a change in the quantity of sales you have made since the mine has closed down?
- Have customers been buying more or less things since the mine has closed down?

Employee situation:

- How many employees do you have? How many are Inuit, non-Inuit?
- Have some of them worked at the mine? If so, is that why you hired them?
- Do you have trouble finding qualified and/or willing workers?
- Do you notice a difference in the work ethic between those that worked at the mine and those that haven't?

Business climate:

- What is the business climate like here? Is it easy or hard to do business here?
- Has there been a high turnover for businesses?

Opinions of mining:

- Do you think that the mining company did enough business with the local businesses? Why/Why not?
- Would you be interested in doing business with a mine if one was to open in the area, but not necessarily with road access to the community?
- Would you diversify your business if you knew that by offering a different service you could do more business with a mine?
- In your opinion, did the mine bring very much business into the community?
- Do you think the mine should have done more business with the community? Why/Why not?
- If a mine were to open here again, how would you like to see it do business with the community?
- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- What can/do communities fall back on once mining leaves the area?

Questions for mine employee family members:

Family history:

- Which one of your family members worked at the mine?
- How many people live with you and are dependent on the ex-mine employee for support?

Work schedule:

- Did your spouse/family member work on rotation (fly-in/fly-out) or on shift while s/he was working?
- What did you think of this system?
- How did it affect your family life?
- If you had to do it all again, how would you like the work schedule to be?

Impact on family life:

- How was your family's life when your spouse was working at the mine compared to when s/he wasn't working?
- What impact did the mine have on your children?
- Was life better or harder while your spouse was working?
- What were the good things about the work?
- What were the bad things about the work?
- How did life with the mine employee's salary compare to now?

Children education:

- What was the schooling like in Nanisivik compared to Arctic Bay?
- Do you think kids in Arctic Bay have as good of an education as those that went to school in Nanisivik?
- Do you think that kids with a family member that worked at the mine do better in school than those who have never had a family member work at the mine? Why?

Life at Nanisivik versus life at Arctic Bay (for Arctic Bay residents only):

- What was life like living in Nanisivik compared to life in Arctic Bay?
- Did you live in Nanisivik or did you stay in Arctic Bay and why did you make the decision to do that?

Opinions of mining:

- Would you want your family member to work at a similar job again? Why/why not?
- If a new mine were built in the area and the company decided to build a community there, what would you think of that? What would you think if the company decided to not build a community and had the workers work on rotation instead?
- What would you rather: a new community be built close to the mine or a rotation system be set up where miners would work away from home for a few weeks and then return? Why?

- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?
- How do you like the idea of a family member going away to work at a mine if it meant that they could provide for your family?
- Would you rather the family member work on rotation or at a community?
- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- What can/do communities fall back on once mining leaves the area?

Questions for elders:

Personal life experience:

- What was life like when you were young?
- Where did you live?
- How did your family provide for itself?
- When did you move into the community, or another community like this one?
- How did you find that?

Changes to Inuit culture:

- How has the existence of the mine changed the community? (the Inuit that live in the areas)
- How do you think life is different now that everyone lives in communities?
- What do you think about the wage economy?
- Do you think it has changed the Inuit culture for better, or for worse?
- How has life changed here since the mine was constructed?
- How has life changed since the closing of the mine?

Personal experience with mine:

- Did any of your family members work at the mine? Or anyone else that you know?
- What do you think their impressions were with respect to work at the mine?
- Did you benefit from their work? How?

Opinions on mining:

- Do you think that mining companies understand the Inuit culture?
- Do you think that the Inuit here would want to work at a mine if it meant they had to stay away from home for a few weeks?
- Would you like to see more work in the mining industry for the people of the community?
- Do you think it would be beneficial to the community?
- What do you think is a better set-up for the work schedule: rotation (fly-in/fly-out or a new community being built?
- Why is rotation better in your mind/why is a new community better in your mind?
- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?
- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- What can/do communities fall back on once mining leaves the area?

Questions for council members:

Community/mining company relationship:

- What was the relationship between the mine and the council/community?
- Was the council consulted about mine issues that affected the community?
- If the community had a concern about something related to the mine, could the council voice this concern with the mining company?
- Would the mining company listen?
- How much consultation took place before the mine got the go-ahead?
- Was the community involved?

Opinions about mining:

- If a company proposed to set up a mine close to the community today, how would you go about making sure you had a say in the matter, and what would you want to try and achieve?
- With the formation of Nunavut, and the signing of the land claim agreement, do you know what you are entitled to when it comes to dealing with mining companies?
- Does the community have a development plan?
- Would you like to see more mining work for the people of your community?
- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?
- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- What can/do communities fall back on once mining leaves the area?

Questions for community members with specific roles:

School officials:

- Where are you from?
- How long have you been teaching here?
- What is it like teaching in an Inuit community?

Enrolment:
- Has enrolment increased at the school since the mine opened?
- Have more people graduated from high school since the mine opened?
- Has the interest in school increased because of the mine and the jobs that can be had working for a mining operation?
- What is the drop out rate?
- Why do the students drop out?

Curriculum:
- What is the curriculum like?
- Are classes taught in Inuktitut?
- Are there any specific classes where mining industry job opportunities are explained or where geology or mining is taught as a subject or part of a course?

Attitudes:
- Have students' attitudes changed now that the mine has closed with respect to motivation for schooling?

Schooling and mining:
- Did the students ever get to visit the mine?
- What did they think of it?

Funding:
- Did funding for the school change once the mine was in operation?
- Did the funding for the school change once the mine closed?

Nanisivik/Arctic Bay specific
- Did funding for the Arctic Bay school change once the Nanisivik School was opened?
- Has there been a difference in grades and graduation rates since the mine opened? Since the mine closed? Between the two school?
- If there has been a difference, what was/were the cause(s) of the change?

Opinions about mining:
- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?

- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- How can mining companies impact the school system for the better?
- How can mining companies impact the education of community members for the better?
- What can/do communities fallback on once mining leaves the area?

Health officials:

- Where are you from?
- How long have you been here?
- What previous experience is needed in order to work here?
- Have you worked in other Inuit communities?

Services:

- What services does this health center offer?
- Is counseling one of the services offered?
- Do people use the counseling service?
- What is it that most people need help with?
- Have staffing levels changed since closing of mine?

Health practices:

- What is the community's alcohol policy?
- What are some of the most important health issues in the community?

Mining and health:

- Were/are there visits related to work at the mine?
- Were/are there visits related to a family member that works at the mine?
- Were their visits related to loss of job after the closure of the mine?
- Have you noticed an increase or decrease in the incidence of certain diseases, sicknesses or injuries while you have been working in the north? Anything due to the mine?
- After the mine closed, was there an increase in depression, family violence, alcohol abuse, etc. in the community, or any other disease or sickness?

Opinions of mining:

- Do you think that the mine affected people's health? In a positive/negative way?
- What do you think is the impact of a mine on a community such as this one in terms of health?
- How can mining companies impact the health of community members for the better?
- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?

- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?

RCMP:

- What is the history of the unit in this community?
- What are the most common crimes?
- Do people respect the RCMP officers?
- Has there been a difference between crime levels during mine operation and after mine closure?
- How has the mine affected crime in the community?
- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?
- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- What can/do communities fall back on once mining leaves the area?

Community members (who do not live with an ex-mine employee):

- What do you think are the impacts of the mine on the community? In terms of jobs? Business? Education? Environment? Health? Community development? Crime?
- Do you know anyone who worked at the mine? Who?
- Do you know anyone who lived at Nanisivik? Who?
- Did you ever want to work at the mine? Did you ever try to work at the mine? If you did, why didn't you go to work there?
- Was the mine a good thing for the community?
- Did you ever attend community meetings that discussed mine issues?
- What would you like to see done differently if a mine was to start up now?
- What do you think of mining as a way to develop Nunavut's economy?
- What should mining companies do before they can build their mines, in terms of community involvement?
- Who benefits from the mining projects in Nunavut?
- Do the communities really benefit from mining? If yes, how do they benefit?
- What can/do communities fall back on once mining leaves the area?

Appendix B Research Ethics Board approval for fully-detailed research proposal

UNIVERSITY OF ALBERTA

Arts, Science & Law Research Ethics Board (ASL REB)

Certificate of REB Approval for Fully-Detailed Research Proposal

Applicant: Léa-Marie Bowes-Lyon

Supervisor (if applicable): Dr. Jeremy P. Richards

Department / Faculty: Department of Earth and Atmospheric Sciences, Faculty of Science

Project Title Comparison of the Socio-Economic Impacts of the Polaris and Nanisivik Mines: A Sustainable Development Case Study

Grant / Contract Agency (and number): Government of Nunavut, INA, NTI

(ASL REB member) **Application number**: TJ-0604-221

Approval Expiry Date: June 16, 2005

CERTIFICATION of ASL REB APPROVAL

I have reviewed your application for research ethics review and conclude that your proposed research meets the University of Alberta standards for research involving human participants (GFC Policy Section 66). On behalf of the *Arts, Science & Law Research Ethics Board* (ASL REB), I am providing expedited research ethics approval for your proposed project.

Expedited research ethics approval allows you to begin your research with human participants, but is conditional on the full ASL REB approving my decision at its next meeting (***June 24, 2004***). If the full ASL REB reaches a different decision, requests additional information, or imposes additional research ethics requirements on your study, I will contact you immediately.

If the full ASL REB reverses my decision, and if your research is grant- or contract-funded, the Research Services Office (RSO) will also be informed immediately. The RSO will then withhold further funding for that portion of your research involving human participants until it has been informed by the ASL REB that research ethics approval for your project has been granted.

This research ethics approval is valid for one year. To request a renewal after ***June 16, 2005***, please contact me and explain the circumstances, making reference to the research ethics review number assigned to this project (see above). Also, if there are significant changes to the project that need to be reviewed, or if any adverse effects to human participants are encountered in your research, please contact me immediately.

ASL REB member (name & signature): Dr. Thomas E. Johnson

Date: June 16, 2004

Appendix C Letter of introduction and consent form for interview participants

Hi!

I am doing research comparing the social and economic impacts of the Polaris Mine on Resolute and the Nanisivik Mine on Arctic Bay. I want to compare the positives and negatives that the mine has had on your life. I will do this by documenting people's opinions about the mine on topics such as employment levels in the community, training courses offered, effects on the business community, and community/mine relations during mine operation and after closure. I will use this information to prepare a report that can be used by all Inuit and mining companies in the future to improve community/mining relations. It is hoped that with this information the Inuit can obtain greater benefit from the jobs, infrastructure, and development that mines can offer. This research might not affect you directly, but it can benefit Inuit in other parts of Nunavut and other parts of Canada. Participants will include elders, council members, mine employees, mine employee family members, business people, school officials, health officials and members of the community at large.

I would like you to join me in an interview where I will ask you questions related to my project. This interview should be no longer than an hour and can be done in the place of your choosing. I will record the conversation with a digital audio recorder to assist with the translation of the conversation. The interpreter agrees not to discuss any part of the conversation with other persons besides me. All conversations will remain confidential. I will not use your name in the study or while recording the conversation. Instead, I will assign a label to you, and only I will know which label represents whom. This label will appear next to any direct quote used in the final report taken from your conversation. If you so choose, your conversation will not be quoted. All interview material, including digital recording and written transcripts, will be stored in my office and in my computer. The data will only be accessible by my thesis supervisor, Dr. Richards and me.

I will use the interview results for my Master's thesis. A copy of the thesis will be left with the council for all to view. Your help is greatly appreciated and your participation will be beneficial to all Inuit in future community/mining relationships. If you have any further questions or concerns, please feel free to contact me. I would be more than happy to answer any questions or concerns that you might have.

Thank you for your cooperation!

Léa-Marie Bowes-Lyon
Department of Earth and Atmospheric Sciences
University of Alberta
Edmonton, AB, T6G 2E3
(780) 492-8992, leamarie@ualberta.ca

Consent Form

Comparison of the socio-economic impacts of the Nanisivik and Polaris mines: A sustainable development case study

Investigator: Lea-Marie Bowes-Lyon
Department of Earth and Atmospheric Sciences
University of Alberta
Telephone: (780) 492-8992 Fax: (780) 492-2030
E-mail: leamarie@ualberta.ca

Consent:

- You received and understand the introduction letter.
- You agree to participate in this study.
- You have asked and received answers to all your questions and concerns and can continue to do so throughout the study if you require additional clarification.
- You understand that you can withdraw from the study if you no longer want to participate.
- You agree to have your conversation with the researcher audio taped.
- You understand what the information you provide will be used for.
- You understand who will have access to the information that you provide.
- You understand how the information you provide will remain confidential.

By signing your name below, you indicate that you have read, understood and agree with all the above statements.

Interview participant Date