Understanding and Addressing the Social Impacts of Closure at the Raglan Mine, Nunavik, Quebec

By © Vanessa Potvin

A Thesis submitted to the school of Graduate Studies in

partial fulfillment of the requirements for the degree of

Master of Science

Department of Geography

Memorial University of Newfoundland

October 2021

St. John's, Newfoundland and Labrador

ABSTRACT

In the past, mine developments did not require remediation and closure plans. Mine sites were shut-down unexpectedly and left abandoned, resulting in everlasting impacts on the environment and to the communities that were involved. As a result, mine closure plans are now required from the very onset of mine development. However, in order for a mine closure plan to be successful, community engagement is critical but is often lacking; this poses an even greater challenge when working with Indigenous communities whose values and beliefs vary from those of technical experts that aim to improve the mine site after it has been closed. The Inuit communities of Salluit and Kangiqsujuaq are located in proximity to the Glencore Raglan Mine. The Raglan Mine is working to develop a closure plan that encompasses local and Inuit concerns regarding the future closure of the mine. An in-depth literature review was conducted and semi-structured interviews were undertaken with Inuit to understand their concerns regarding the closure of the Raglan Mine, and also their vision for a post-mining economy.

Results revealed that the Inuit of Salluit and Kangiqsujuaq have strong and clear views for various aspects of mine closure, including infrastructure and the environment. These communities welcome future engagement from Raglan Mine to develop a closure plan that satisfies all parties. The results of this research emphasize the need for mining companies to collaborate with all impacted parties in order to achieve successful closure at current and future natural resource developments.

ACKNOWLEDGEMENTS

There are many people that I would like to thank, for without them, this research would not have been possible. To start off, I would like to thank Dr. Arn Keeling for his continuous support, encouragement, and expertise. Most importantly, I would like to thank him for his patience with me while writing this thesis. I always felt reassured every time I had completed work that wasn't perfect, decreasing my confidence but Arn would remind me that writing a Master's thesis is a learning experience and mistakes will happen. I would also like to thank Dr. Julia Christensen who sat on my supervisory committee. Julia was able to provide a review of my thesis, and provide constructive feedback based on her knowledge and expertise. Both Dr. Keeling and Dr. Christensen played major roles in helping me complete my thesis, as they provided me with their own wisdom and experiences to support me through the process. Shannon Fraser also played a major role throughout this process as she provided me with many detailed comments and suggestions to assist in making my work the best that it can be.

To the rest of the faculty, staff and students at Memorial University, I would like to say thank you to each of you as well. Everyone was extremely welcoming, caring, and supportive. I often told my friends and family who would ask me about my program and the department that it is like one big family, where everyone gets along. I will be forever grateful for that experience. More specifically, I would like to thank Caitlynn Beckett for her help and support at the beginning of this thesis. She introduced me to several community members from Salluit and Kangiqsujuaq whom she previously had met. Caitlynn was also there to support me through my work and when things got difficult, she was someone I could count on to talk to. Secondly, I would like to thank Miranda Monosky who took time out of her busy schedule to assist me in the

revisions of my final chapters. I will be forever thankful for her guidance and expertise that helped me to complete my thesis.

I would like to give a huge thank you to the Raglan Closure Plan Sub-Committee. The committee members welcomed me with open arms, and were very caring and supportive throughout the entire research process. The Raglan Team was very approachable, thoughtful and intelligent. Without the support of Raglan this research would not have been possible. The Inuit Parties who sit on the sub-committee I also owe a huge thank-you to. Each individual provided me with their experience and knowledge for integration into this report. Not only that, but they were huge supporters for this research to be undertaken as they want to ensure a proper closure plan for the Raglan Mine. To all of the participants that I interviewed, thank you – from the bottom of my heart, for accepting me into your community and taking the time to share your knowledge with me. And to each person who helped me conduct interviews including Jamie Yakaa, Alasie Arngak, and Anna Angutigirk -with each of your support I was able to feel confident while undertaking interviews.

My research would not have been possible if it wasn't for the funding of the Social Sciences and Humanities Research Council, the Natural Science and Engineering Research Council, and the Northern Scientific Training Program. Each of these research committees supported my research by providing me with the financial support needed in order to participate in fieldwork. Subsequently, their funding allowed me to attend and present at multiple conferences. These conferences not only allowed me to share my research but also helped me to develop my professional portfolio.

Last, but very certainly not least, I owe a giant thank you to my parents Mike and Teresa Potvin, and my sister Alex Potvin. Their never-ending support, perseverance, and encouragement

is what helped me to complete this thesis. They have supported me not only financially, but have been thoughtful and considerate, and have pushed me to be the best that I can be. My sister, specifically took time out of her day to help me to complete the best work that I possibly can. With that said, I will be forever in debt to my family. And to my friends like Ally Ortolan, Hilary Upshall and Hailey Punt (to name a few), thank you for always being there when I needed a shoulder to cry on, or someone to talk to. The amount of people who helped and encouraged me throughout this journey is endless, and I thank each and every one of you.

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List of Acronyms

CPSC – Closure Plan Subcommittee

CSRM – Centre for Social Responsibility in mining

EQA – Environmental Quality Act

HBC – Hudson Bay Company

IBA – Impact and Benefit Agreement

ICEHR – Interdisciplinary Committee on Ethics in Human Research

ICMM – International Council on Mining and Metals

JBNQA – James Bay Northern Quebec Agreement

KEAC – Kativik Environmental Advisory Committee

KEQC – Kativik Environmental Quality Commission

KRDC – Kativik Regional Development Corporation

KRG – Kativik Regional Government

KSB – Kativik School Board

LHC – Landholding Corporation

MERN – Ministry of Energy and Natural Resources

MELCC – Quebec Ministry of the Environment and Fight Against Climate Change

MTQ – Ministry of Transportation

NRBHSS – Nunavik Regional Board of Health and Social Services

QMS – Quebec's Mineral Strategy

RIDE – Rapid Inuit Development and Employment

RCMP – Royal Canadian Mounted Police

SEPA – Socio-Economic Participation Agreement

TSF – Tailings Storage Facility

TERRE-NET – Towards Environmentally Responsible Resource Extraction Network

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CHAPTER ONE: INTRODUCTION

1.1. Introduction

Mine closure has become one of the greatest sustainable development challenges within the mining industry (Kemp, Clark, & Zhang, 2007). In 2018, Douglas Morrison, president and CEO for the Centre for Excellence in Mining Innovation stated that "[mine closure] is the single most important thing that our industry does" (Hiyate, 2018, p.29). For many, this remark would come as a surprise, given that the act of closure itself implies the end of a project and, with it, the end of profits. However, Morrison's comment underlines the reality that the environmental, social and even political responsibilities inherent to mining operations in the contemporary Canadian context are not simply limited to the mine's life, but extend into the future through closure, reclamation and remediation.

Closure occurs because the process of mineral extraction ends as resources become depleted or mineral production becomes uneconomic. In fact, it can be the costliest phase of the mining cycle. There are a few steps involved in the closure process. The first and most obvious is the physical shut down of the mine where production stops and the workforce is reduced (Minerals Intelligence Capacity Analysis ("MICA"), 2020). Decommissioning of the mine site takes place next, when equipment and infrastructure is taken apart and is repurposed or demolished. Next, remediation and reclamation occur, which returns the environment to an acceptable state, followed by relinquishment and monitoring which take place in perpetuity (MICA, 2020). Very rarely are companies able to close a mine to the point where both the industry and communities are satisfied with the closure procedures (Hiyate, 2018). Some of the

environmental impacts from mining are permanent, lasting for many years longer than the life of the mine itself, making it the most important phase of the mine cycle.

It is important to differentiate reclamation from closure: reclamation (also known as remediation) pertains to the environment and steps to return the land to a planned state, whereas closure refers to processes such as the physical shut down of the mine and its economic operations (Otto, 2009). Dance (2015, p.43) defines reclamation as "planning, engineering, and management strategies undertaken to help monitor, mitigate and remove disturbances and pollution in areas affected by mining." Reclamation therefore includes activities such as the revegetation of land, dismantling and decommissioning of buildings, and the restoration of contaminated soils (Quebec Ministry of Energy and Natural Resources ("Quebec MERN"), & Ministry of Sustainable Development, Environment, and Fight Against Climate Change ("MELCC"), 2017). Closure is the physical shut down of the mine meaning all equipment is removed, monitoring and management has been completed, and communities are no longer engaged with (Otto, 2009). Although both terms will be used throughout this thesis, the research herein explores both the environmental and socio-economic aspects of mine closure.

A wide spectrum of social impacts may result from mine closure. These impacts range from changes in quality of life to land use changes (SNC-Lavalin & Raglan Mine, 2015). Some of the major community impacts of mine closure include adverse impacts to local economies, impoverishment, loss of key services and outmigration (Bainton & Holcombe, 2018a). More specifically, impacts of closure include but are not limited to mass loss of employment - one of the most serious and long-lasting consequences - weakened social structures, health impacts leading to depression and hopelessness, and damage to community cohesiveness (Ackermann, Botha, & van der Waldt, 2018; Haney & Shkaratan, 2003; Hipwell et al., 2002).

Most mine closure plans emphasize the rehabilitation of a mine from an environmental perspective (Burns & Church, 2018; Rixen & Blangy, 2016). Addressing the social aspects of closure necessitates consultation, but consultations remain rare occurrences. Not only that, but promises made to Indigenous communities about economic and social benefits are often limited (Rixen & Blangy, 2016). This leaves communities with little capacity to mitigate the negative impacts of mining and mine cessation (Rodon & Levesque, 2015). In particular, one of the challenges of mining reclamation in the Canadian North is the need to integrate the values and concerns of Indigenous peoples (Burns & Church, 2018; Rixen & Blangy, 2016). Northern communities do not always reap the socioeconomic benefits that might be generated by either the mining project or by mine closure; nor do they have the political leverage to direct mine closure plans on traditional lands. Reclamation practices in the North must account for Indigenous rights and construct an alternative process that introduces Indigenous values into the closure process (Monosky, 2020).

Research considering the social impacts of mine closure remains underdeveloped. Mine closure and its social dimensions are receiving increasing attention in the scholarship on mining. But, few studies focus on the process of closure planning itself to understand how local and community concerns can be incorporated into planning. In fact, current literature fails to document closure practices that have been exemplary, regardless of the inclusion of social aspects. It has been argued that the mining industry has yet developed social capabilities necessary to understand and address the risk associated with mine closure to minimize impacts (Bainton & Holcombe, 2018b).

This research provides a case study of a closure plan in action as a means of contributing to state policy and mining industry reorientations to social closure as an integral aspect of mine

closure planning. Specifically, my research examines Inuit community engagement for closure planning for the currently operational Glencore Raglan Mine in Nunavik, Quebec's territory north of the 55th parallel. The nickel and copper mine operation involves several underground mines, located along the property which stretches 70km from east to west (Rodon & Levesque, 2015; Natural Resources Canada, n.d.). Raglan Mine is owned by Glencore, one of the world's largest mining companies, with over 150 operations in over 35 countries globally (Glencore, 2021; Government of Canada, 2018). The Raglan Mine, which opened in 1997, is not forecast to cease operations until 2041, but is obligated to provide updated closure plans to the Quebec government every five years (the most recent version was accepted by the government in 2019). In 2018, a closure planning subcommittee (discussed below) was established in order to navigate the long-term environmental and social consequences of mine closure in collaboration with the mine's Inuit partners from communities located near the mine.

Figure 1.1 Map showing the location of Raglan Mine in proximity to the Asbestos Hill site. Retrieved from Charlie Conway.

Through this research, I investigate the involvement of the Nunavik Inuit communities of Salluit and Kangiqsujuaq in closure planning for Raglan Mine (Figure 1.1). This thesis aims to help document the

knowledge and concerns of the Salluimuit and Kangiqsujuamuit related to the future closure of the Raglan mine, contributing to the work of a collaborative closure planning committee that includes Inuit parties, the company, and university researchers. In doing so, this study will also contribute to a growing body of knowledge on social mine closure. The objectives of this study are three-fold: *1) To better understand the social impacts of mine closure in Northern and remote communities. 2) To understand how Inuit envision mine closure for the Raglan Mine, to contribute to the knowledge of the Closure Plan Sub-Committee. 3) To add to the growing body of literature on social mine closure, through a case study of community-engaged mine closure planning.* This research is therefore guided by four research questions that are as follows:

1. What are the most important values of community members to be incorporated into the closure plan?
2. What would be an ideal closure plan for the mine, as described by community members?
3. What aspects of the local environment are most important to the community, to help prioritize steps for closure?
4. How can community engagement be improved to ensure proper communication about mining activities in the region, including that of mine closure?

I want to respectfully acknowledge this research took place in the traditional territory of the Nunavik Inuit. This research project emerges from a unique partnership between Raglan Mine Closure Plan Subcommittee, the Inuit communities of Salluit and Kangiqsujuaq, and Towards the Environmentally Responsible Resource Extraction Network ("TERRE-NET"). This research also aims to inform other resource development industries on how to engage and communicate with communities associated with their resource extraction projects.

1.2. History of Arctic Quebec & Nunavik

In order to better understand the resource development sector in Nunavik, it is important to first understand the region's historical and political context. Arctic Quebec has been inhabited for over 3500 years, starting with the migration of the pre-Dorset people from 2500 to 1300 B.C (Barger, 1979; Vick-Westgate, 2002). This region, known today as Nunavik, was occupied by the Dorset culture when they arrived in 900 B.C. and years later by the Thule people – ancestors of today's Inuit – before the 14th century A.D. As the Thule people migrated from Alaska, they brought the introduction of various tools and technologies such as the bow and arrow, the igloo, the kayak, and whaling practices (Barger, 1979; Vick-Westgate, 2002). Contact between the Thule and the British, Danish, and French began when European explorers began searching for the Northwest Passage in the 16th century (Vick-Westgate, 2002). Throughout this time, many explorers travelled to the islands north of the Hudson Strait, avoiding contact with the mainland shores to the south including the Ungava Peninsula (Barger, 1979; Vick-Westgate, 2002).

The fur trade brought more intensive contact between the region's Inuit and Europeans. The Hudson Bay Company (HBC), founded in 1670, conducted some trading in the region starting in the 1750s and established a trading post at Fort Chimo (Kuujjuaq) in 1830 (Barger, 1979; Vick-Westgate, 2002). The French company Révillon Frères later opened a series of trading posts around Ungava Bay, including at Salluit (1903) and Kangiqsujuaq (1910) (Hervé, 2017). As a result, many Inuit began trapping foxes to trade. The fur trade with introduced Inuit to new technology such as guns, needles and metal tools (ie. cooking utensils) which they adopted and adapted to as it improved their lives. In addition to hunting and fishing, trapping soon became an additional means to subsistence for the Inuit.

For over two hundred years, the Ungava region was part of Rupert's Land, which was under management of the HBC Corporation (Vick-Westgate, 2002). In 1870, Rupert's Land was bought from the HBC by the Dominion of Canada, becoming part of the North-western territories (Barger, 1979; Vicki-Westgate, 2002). By 1912, this region was transferred to the province of Quebec and renamed Nouveau Quebec. At this time, no significant government presence was established (beyond the RCMP) and the region was not actively administered by the province until after World War II (Vick-Westgate, 2002). The main non-Inuit presence in the region, in addition to fur traders, were Anglican and Catholic missionaries, who competed to convert Inuit to Christianity (Hervé, 2017).

By the 1930s, the fur trade began to decline resulting in hardship for Inuit across the Arctic (Tester & Kulchyski, 1994). In response to episodes of hardship and starvation, some Inuit were relocated from Inukjuak in Nouveau Quebec to newly established High Arctic communities (Tester & Kulchyski, 1994). Nunavik Inuit faced additional changes following World War II, as the fur trade continued to decline and the need for medical care and welfare services increased (Vick-Westgate, 2002). Throughout the 1950s the government of Canada began to establish cooperatives throughout Nouveau Quebec to promote economic development and introduce Inuit to a cash economy. This included employment and the development of government policies encouraging Inuit into settlement living (Vick-Westgate, 2002). This led to the establishment of the 14 communities along the coast of Nunavik (Makivik Corporation, 2014b). In 1953, the Department of Northern Affairs and Natural Resources was established to assume the responsibility of administering Quebec's northern communities which was seen as an "increasingly expensive burden" to the federal government. Active Quebec provincial government administration of the region was not established until 1963. In 1971, when

hydroelectric power developments were proposed for the James Bay area threatening traditional hunting grounds, the James Bay Northern Quebec Agreement (JBNQA) was signed, establishing a regional government for the northern Quebec region (Herve, 2017).

The JBNQA was the first modern treaty in Canada, signed in 1975 (Rodon, 2014; Wilson 2017). The agreement created a regional government that would respect both provincial and federal laws, while granting limited administrative authority to the Cree in Eeyou Istchee and Inuit in Nunavik (Rodon, 2014). Subsequently, four administrative bodies were established to provide public services to the residents of the region; Kativik Regional Government ("KRG"), Kativik School Board ("KSB"), Kativik Regional Development Corporation ("KRDC"), and Nunavik Regional Board of Health and Social Services ("NRBHSS") (Bone, 2017). The signing of this agreement also presented Inuit with the opportunity to secure compensation, settlement lands, traditional practices, and other basic services (Avataq Cultural Institute, 2010). It was during this time the region's name changed from Nouveau Quebec to Nunavik, which means *the place where there is land* in Inuktitut (Rodon, 2014).

This period also saw increased mining exploration and development in the region. Mineral exploration led to discoveries of asbestos, iron, and nickel in the Ungava Trough (Duhaime, Bernard, & Comtois, 2005). Established in 1972, the Asbestos Hill (Purtuniq) mine was the first mine to operate in the region. The mine, operated by Société Asbsestos Ltée., employed 400 men, most of whom were French-Canadians, as well as some Inuit from nearby communities (Carney, 2016). However, as the negative impacts of asbestos fibers were discovered, markets declined and the Asbestos Hill Mine was rapidly shut down in 1984. Only limited remediation efforts were undertaken, leaving considerable landscape damage. An inspection of the site in 1989 found that all infrastructure was left intact, the mine was not

backfilled leaving an open pit at a depth of nearly 800 feet, tailings were left uncapped, and waste rock piles were found surrounding the mine site (Carney, 2016; Poirier & Brooke, 2000). During the early development of the Raglan mine, then-owner Falconbridge Ltd. undertook remediation efforts in which infrastructure was dismantled, hazardous materials were disposed of, and valleys that were located around waste rock piles were filled. By 1996, Falconbridge spent $3 million to clean up the site, and efforts continued until 2004, but remediation remains incomplete (Carney, 2016). However, the Quebec government has recently assumed responsibility for completing the remediation of the site (Government of Quebec, 2019). This does not relieve the Inuit of their concerns about cumulative and delayed environmental impacts from the Asbestos Hill site (Carney, 2016).

Although the Raglan nickel deposits were discovered prior to the development of Asbestos Hill, it would be many years before they could be developed. Explorers first discovered nickel and copper deposits in the Ungava Peninsula in the 1930s, with further exploration beginning in 1957 (Glencore-Mine Raglan, 2021; Lewis & Brocklehurst, 2009). Throughout the late 1960s, nickel prices were dropping, but when they rose again in 1990, mining interest for Raglan soared (Dufresne, n.d.; Glencore-Mine Raglan, 2021). Initially, Falconbridge implemented the exploration and development for the Raglan Mine. Exploration occurred on lands where consultation of local populations was not a requirement. However, the Kativik Environmental Quality Commission (KEQC), created as a result of the JBNQA, allowed Inuit to intervene directly with certain development projects. The KEQC demanded an environmental and social impact assessment be undertaken and the negotiation of an Impact and Benefit Agreement (IBA), although there was no other legal obligation to establish one (Keeping, 1998).

Falconbridge engaged in negotiations with the Inuit communities of Salluit and Kangiqsujuaq, resulting in the conclusion of an IBA in 1995. This agreement was signed between Makivik Corporation, Société Minière Raglan du Québec Limitée, the villages of Salluit and Kangiqsujuaq, and their respective landholding corporations ("LHC") (Rodon & Levesque, 2015). Known as the Raglan Agreement, this IBA was the first of its kind in Canada (Glencore – Mine Raglan, 2020; Rodon & Levesque, 2015). The Agreement has remained in force despite subsequent mine ownership changes from Falconbridge, to Xstrata and now Glencore.

In general, IBAs are signed between mining companies and Indigenous groups in Canada for a variety of reasons. Without an IBA or similar agreement (such as the Socio-Economic Participation Agreement ("SEPA"), mining endeavors will typically not be approved within Canada (Lewis & Brocklehurst, 2009; Sosa & Keenan, 2001). IBAs are privately negotiated agreements without government involvement, and serve two main purposes (Caine & Krogman, 2010; Kielland, 2015; Sosa & Keenan, 2001). The first purpose is to address and mitigate impacts that the mine has on the community, whether social, economic, or environmental. The second purpose is to ensure the community receives benefits that result from the mine development. As they are private contracts, some or most of the information within these agreements remains confidential (Mills & Sweeny, 2013; Kielland, 2015).

In signing an IBA with the company, Nunavimmiut established the basis for a long-term economic relationship with Raglan Mine. The IBA also allowed for the transport of mining ships through the Hudson Strait and Hudson Bay, as the Inuit had pending claims to these shores (Keeping, 1998). Other objectives of the Raglan Agreement include:

1. Facilitating the development of Raglan Mine in an efficient manner and preserving the integrity of the environment.

2. Ensuring that the Inuit directly enjoy the social and economic advantages throughout the active life of Raglan mine.
3. Making sure that the impacts of the Raglan Mine operations on the environment are measured and that unforeseen impacts are managed.
4. Providing a good work environment to all parties.
5. Facilitating the participation of Inuit beneficiaries in the Raglan Mine operations.
6. Updating the outcome of discussions on environmental and social impact studies.
7. Maintaining the support of the Inuit parties to the Raglan Mine operations.

By signing this agreement, Raglan recognized its responsibility to include Inuit beneficiaries during development and operation phases, establishing an ongoing relationship (Raglan Agreement, 1995). The 69-page document deals with financial issues and environmental matters, though it leaves out the social and economic impacts of the mine during operation and after closure: "both the company and the government refused to fund such monitoring after the mine opened" (Czyzewski , Tester, Aaruaq, & Blangy, 2014, p. 2). However, the agreement does address environmental protection and economic provisions for communities while the mine is in operation.

The Raglan Agreement includes profit sharing, trust fund payments and preferential hiring for Inuit for the years that the mine is in operation (Natural Resources Canada, 2018). Under the agreement, 4.5% of the profits from the mine go to Salluit, Kangiqsujuaq, and to the Nunavik region. Due to its proximity to the mine and port at Deception Bay where all the shipping takes place, Salluit receives the greater share. These royalties are paid to individual Inuit beneficiaries in the communities as well as through community investment funds. Benefits also include scholarships totaled at $50,000 that are awarded annually to students who want to

pursue a career at the Raglan mine, recognizing students for their quality work and academic results (Glencore – Mine Raglan, 2020). All of the above-mentioned payouts and profit sharing has not only led to financial benefits but has also created substantial economic opportunities for the Inuit, as Raglan has paid out over one hundred million dollars to Nunavik Inuit since 1997 (Rodon & Levesque, 2015).

Another condition of the agreement was to hire Nunavik Inuit at the mine. Raglan initially committed to making the workforce 20% Inuit (Rodon & Levesque, 2015). Like other Arctic mines, Raglan struggled to meet this target as for years they were not able to get above a 17% Inuit workforce. Inuit employee turnover rates were high at 70% (Czyzewski et. al., 2014; Rodon & Levesque, 2015). In an effort to boost its Inuit workforce, Raglan developed the Tamatumani (meaning 'second start' in Inuktitut) training program in 2008 aiming to "attract, retain, and integrate Inuit into the mine's workforce" (Rodon & Leveqsue, 2015, p. 20). Subsequently, the Rapid Inuit Development and Employment ("RIDE") program was developed to compliment Tamatumani in 2013. This program trains Inuit to allow them to become more versatile in order to gain positions with a higher level of responsibility to take their career to the next level (Natural Resources Canada, 2018). It is important to get advanced skills through programs like the RIDE program as Inuit typically do not acquire senior employment or executive positions in mining, according to Rodon and Schott (2014).

An outgrowth of the Raglan Agreement is the Raglan Committee. The committee, which includes representatives of the mine and the Inuit parties, works to ensure that the IBA is implemented on a continuous basis and to foster dialogue between partners is maintained (Mines Quebec, 2017). Information relating to the mine operations is shared at the Raglan Committee and any problems or concerns are also brought forward for discussions and resolutions (Lewis &

Brocklehurst, 2009). For instance, starting in 2016 the Raglan Committee was consulted for approval for the Sivimut Project, Phases II and III of the Raglan Mine, which will extend the life of the mine beyond 2040. Phase II involves the development of two new underground mines where Phase III constructs another three underground mines. As five new mines will be developed, the tailings storage facility will be expanded during Phase III.

In light of the mine's expansion and the progressive reclamation of earlier phases of the mine, the Raglan Committee decided to create a Closure Plan Sub Committee (CPSC) to review the current closure and reclamation plan. Formed in 2018, the CPSC is a unique undertaking with potentially instructive outcomes for future policies and processes. The sub-committee includes Inuit partners from Salluit and Kangiqsujuaq, and representatives from the Raglan Mine, Makivik Corporation, Université du Québec en Abitibi-Témiscamingue and TERRE-NET, a network of university researchers. My supervisor, Dr. Arn Keeling, is the TERRE-NET representative on the committee, and as his student I participated in meetings with the committee and helped to develop documents to inform the community about closure planning. This collaboration between the Glencore Raglan Mine, experts and the community, aims to develop a new approach to mine closure planning to be shared throughout the industry.

1.3. Mineral Development and Mine Closure Policy in Quebec

As Nunavik is highly sought-after for resource development by countries around the world due to its cornucopia of mineral resources, Nunavik and Canada will lose out on long-lasting wealth for its citizens if resources are not developed (Intergovernmental Working Group on the Mineral Industry, 2016). In fact, in 2008 71% of new mining claims in Quebec were located in Nunavik. However, the Government of Quebec has exclusive jurisdiction over the harvesting or extraction of natural resources, and it does not always proceed with the interests of

Indigenous peoples in mind (Government of Quebec, 2018). In fact, the government has established a number of initiatives supporting the research and development industry in Quebec to increase competition among local and foreign companies (Government of Quebec, 2018). However, this causes frustration among Inuit as they would like to establish employment for their own people (Government of Quebec, 2018).

Resource development issues in Nunavik are also shaped by Quebec's Mineral Strategy ("QMS"). Although developed in 2009 (prior to Plan Nord), QMS is an integral component of the development of Quebec's North, as it aims to boost Nunavik economies through sustainable resource development and through the creation of new relationships between the industry and Indigenous people (Government of Quebec, 2009). The QMS understands that mines are a major asset to Quebec, and intends to promote the exploration and development in the region (Avataq Cultural Institute, 2010). Integrated community mineral development is probably the most important part of QMS, as it addresses elements that were lacking in the past, such as local and Indigenous participation, consultation with communities, a balance of land uses, and the encouragement of Indigenous involvement in the mineral sector. Although Nunavik has developed such a comprehensive mining development plan, the consideration of mine closure and its impacts are still lacking which could have many consequences for respective Indigenous communities.

Before the 1960s, closure and reclamation planning in Canada was not a legal requirement for most mines (Bowman & Baker, 1998). In other words, prior to the 1960s most mines were simply abandoned, resulting in negative impacts to the environment and communities involved (Dance, 2015; Nolan, 2005; Sandlos & Keeling, 2012; Sandlos & Keeling, 2016). Fortunately, this is no longer permissible today, as most jurisdictions require that

reclamation and closure plans be developed and approved before any permits or licenses to mine are issued (Otto, 2009). In Canada, there is no single comprehensive law for mine reclamation (Dance, 2015). Instead, regulation for mining is shaped by diverse provincial and territorial legislation, permit and licensing systems, environmental review processes, and various guidelines and programs. This makes every mine closure plan unique as each region structures its own reclamation policies and programs (Dance, 2015).

Typical closure and reclamation plans deal with a wide array of practices and objectives. These include managing waste, mitigating toxicants and pollution, decommissioning of structures, and of course managing the environmental issues such as erosion and surface disturbances. For instance, in Ontario, closure plans are to be developed and approved by the province before proceeding with development (Government of Ontario, 2019). Subsequently, a financial guarantee must be held by the ministry that amounts to the estimated cost of the rehabilitation work to ensure that mines are not left abandoned. In the Yukon territory, closure plans must also include input from First Nations and local communities (Yukon Government, 2006). Similarly, the government of the Northwest Territories requires water and land use permits to be approved before construction begins, including reclamation plans and financial securities for closure and reclamation costs (Dance, 2015). Although the aforementioned regulations address environmental measures critical to the successful closure of a mine, they fail to address the social and economic impacts of closure, which can be just as important.

As Anne Dance remarks, “Nunavik’s mine site reclamation regime is shaped by a distinctive government system, [that is a] regional government operating within the province of Quebec” (Dance, 2015, p. 54). Not until 1995 were there amendments to the Quebec Mining Act that required mining companies to submit a closure and rehabilitation plan for approval (Dance,

2015; Séguin & Larivière, 2011). The government of Quebec provides mine closure planning guidelines in order for companies to develop a plan that will be approved and be in accordance with the Mining Act (Quebec MERN, 2021). The requirements set out in the guidelines apply to both mineral exploration and mine sites. The site is to be returned to a satisfactory condition which involves the revegetation of land, the rehabilitation of contaminated areas (i.e. soil), and the dismantling of infrastructure and buildings. A post-closure monitoring and maintenance program is also required. These provisions make the mining company 100% responsible for the site restoration, including 100% of the cost (Quebec Mining Association, n.d.). As a result, the closure must be planned before the development of the mine; the closure plan is then reassessed every five years to ensure the plan remains valid and realistic. Plans are approved by the Quebec Ministry of Sustainable Development, the Environment, and Fight Against Climate Change ("MELCC"), and the Ministry of Energy and Natural Resources ("MERN") (Quebec Mining Association, n.d.). Closure plans undergo revisions in order to adapt to any changes that are occurring on the mine site, and revised closure plans must be submitted every five years.

Unfortunately, the aforementioned guidelines do not make recommendations about the mitigation of social and economic impacts that mine closure can have on associated communities. The emphasis in Quebec's mine closure regulation on decommissioning and environmental protection reflects the neglect of social impacts and community engagement in closure planning across the Arctic more generally. As exploration and mining activity in Nunavik is expected to increase in the coming years, it is imperative that mining companies begin to incorporate a social element into their closure plans (Makivik Corporation, 2014). The following chapter will draw on key historical examples of mine closure in the Arctic and

emerging literature on social closure to highlight key issues and impacts for consideration in closure planning.

1.4. Research Design and Methods

A key objective of this research is to document community members' understandings and concerns related to the closure of Raglan Mine, to inform the work of the CPSC. This study gathers several concerns of community members in order to understand how Inuit community members would like to proceed with closure. In collaboration with community representatives on the CPSC, it was decided that a qualitative approach was the most appropriate method for documenting these views. Therefore, I used in-depth, semi-structured interviews for data collection. Interviewing is a holistic approach structured around participants' expressions of thoughts and feelings (Alshenqeeti, 2014; Boyce & Neale, 2006). Alshenqeeti (2014, p. 40) contends that, "an interview is a conversation, whose purpose is to gather descriptions of the [life-world] of the interviewee." Interview-based research designs therefore involve asking questions of a variety of individuals to explore their perspectives on a particular idea, program, or situation (Boyce & Neale, 2006). In-depth interviewing involves only a small group of participants who are asked detailed questions, which is most appropriate to use when trying to determine thoughts and attitudes about a particular topic. Semi-structured interviews allow for greater flexibility compared to structured interviews, but not as much flexibility as open-ended interviews. Semi-structured interviews use basic questions to guide the conversation, but also allow the interview participant to expand, providing interviewees with the freedom to deviate from the initial questions to talk about what is important to them (Alshenqeeti, 2014; Hesse-Biber, 2017).

Prior to the interviews, I made contact with community members in Kangiqsujuaq in October 2017, and Salluit in March 2018 at the Environmental Forums held in their respective communities. Raglan Mine hosts Environmental Forums on an annual basis in each community to discuss the different research projects that are going on and to provide community members an opportunity to ask questions about different mining operations and research projects. I was present at these events as I wanted to begin to develop my relationship with each community. During this time, an application for this research was submitted to the Interdisciplinary Committee on Ethics in Human Research ("ICEHR") at Memorial University of Newfoundland, which provided ethics clearance in June 2018 (#20190070-AR) and allowed me to proceed with my research.

The CPSC also assisted with drafting interview questions and recruiting participants. Appendix I details the interview guide; questions ranged from the participants' work experience to how they want the closure process to proceed and to what the participants' biggest concerns are with the mine closing in the future. The CPSC reviewed my initial questions and recommended adjustments to ensure that questions asked were culturally appropriate and encompassing of mine closure. As the interviews were semi-structured, the sequence of questions depended upon interviewee's responses, and thus varied from participant to participant. However, in general similar types of questions were asked of each informant (Chilisa, 2012). Interviews were conducted from June 3 through June 16, 2018: nine interviews were conducted in Salluit and five were conducted in Kangiqsujuaq, for a total of fourteen interviews. Financial and time constraints restricted the number of interviews completed. Furthermore, the weather was superb during this time, and participants were busy with land-

based activities. Others were grieving – specifically in Kangiqsujuaq – due to accidents that had occurred prior to or during my stay.

With the help of members of the CPSC and Raglan Mine's community liaison officers (themselves Inuit) in each community, interview participants were selected and contacted prior to my arrival. Participants were selected based on knowledge of or experience with the mine, including former mine workers, current mine workers, those that are engaged with community matters, as well as hunters. Several elders were interviewed for their knowledge of the land and the changes that have occurred since the mine was developed. Many of those interviewed were heavy equipment operators at the mine. Participation in the interviews were also voluntary and confidential. Each participant signed the consent form (Appendix II) that detailed the conditions of the interview, prior to starting.

After data collection, the interviews were transcribed and carefully reviewed and organized into themes. Interview transcription was completed using Microsoft Word and InqScribe. Themes elicited include (1) infrastructure, (2) environmental impacts, (3) employment impacts, and (4) company-community relations. Each of these themes plays a role in the successful closure of the mine. Several different installations in and around the mine site will need to be dealt with once the closure process begins. Environmental impacts are, of course, of great importance to the communities of Salluit and Kangiqsujuaq, and this became quite apparent during interviews. Although the environment is addressed in the closure plan, community satisfaction with how the mine tailings will be managed and monitored is low. What is potentially even more important is the fact that interviews revealed many Inuit do not understand the nature of tailings, making the need for education and engagement on this topic pressing. The

detailed results of these interviews, highlighting community concerns and knowledge about the closure plan, are reported in Chapter 3.

1.5. Qallunaat Research

The rights of Indigenous people, and the protection of their homelands, are of great importance to me. As I studied environmental science for my undergraduate degree, I got the chance to study a variety of topics including that of the Arctic. I wrote papers on oil and gas exploration and extraction, seismic lines in the Arctic borderlands, and climate change impacts in the North. I also got the chance to study Aboriginal knowledge (also known as Indigenous knowledge, traditional knowledge). Through this I was able to make connections with Indigenous leaders such as Rosemarie Kuptana – who is an advocate for the rights of Indigenous people and a previous president of the Inuit Tapirisat of Canada. This experience led to my passion for the protection of the Arctic region – the environment and its people. I entered into this project with the hope that my research will be of benefit to the Inuit of Nunavik, but also to other Indigenous groups around the world as my research will show that it is possible to work together with an industry, benefiting both parties involved.

As a *Qallunaat* (white) researcher on Indigenous land, care had to be taken to ensure proper respect to the people and their environment. In the past, researchers would come into Indigenous communities, conduct their research and leave, providing no feedback or appreciation for the knowledge that they shared (Saxinger & Dun, 2018). As a result, Indigenous peoples have often been objectified by researchers, rather than engaged as partners in research. Researchers also often never gained proper permission to undertake their studies (Saxinger & Dun, 2018). However, in order for research to be successful and for positive partnerships to develop, communities need to be involved in the entire research process; from the creation of

research priorities, proposal review, the allocation of funding, and research implementation (Brunet, Hickey, & Humphries, 2016). As local participation is important for success, individuals should be employed to assist in the research as guides, field assistants and help to encourage researcher participation in local activities (Brunet et al., 2016).

Many of these components were fulfilled during the process of data collection for this research. Proper ethics clearance was granted as previously mentioned. However, what is of greater importance is that Makivik Corporation was consulted, along with community members serving on the CPSC. As the Raglan Mine and Makivik Corporation sit on this committee alongside community members and industry experts, proper permission was able to be granted from all parties to undertake this research in Nunavik (Appendix I and Appendix II). As a guest member of the CPSC, I was given the opportunity to collaborate with local Inuit participants on a frequent basis. This allowed constant feedback from Inuit, from proposal writing through to the dissemination of findings. Local Inuit community liaison officers hired by Raglan Mine assisted with contacting interview participants. In one community, I also participated in several traditional activities such as hunting and snowmobiling, and was invited to attend a high school graduation ceremony. It was such a rewarding experience to watch the students graduate and give their speeches. One could tell how important it was and how hard each student had worked.

Although this research may have been limited due to financial and logistical constraints, many people had also assumed that I worked for the mine as a result of my relationship with Raglan Mine. This caused reluctance among participants in sharing their information until I had made that clarification. However, the unique situation of my placement on the CPSC was more beneficial than limiting. I was given the opportunity to develop relationships with many community members and industry experts. I was able to watch individuals of different cultures

and ethnicity come together and discuss the topic of mine closure. I received assistance and gathered knowledge on how to undertake research in Indigenous communities firsthand.

Throughout this experience, it was my hope that this research would allow Inuit a chance to share their concerns related to mine closure, and to have those concerns recognized and considered for the final closure plan of Raglan Mine. Subsequently, this process allowed me to develop more knowledge on the topic of mine closure through the review of academic literature and discussions with several people from the industry and Inuit communities. As a result, I could not help but express my desire to help the Inuit communities of Salluit and Kangiqsujuaq and other Indigenous communities. Therefore, I hope that this research will bring Inuit concerns to the forefront, not only at Raglan Mine, but for other natural resource development companies as well.

1.6. Conclusion

The primary goal of this research was to determine the concerns of community members in Salluit and Kangiqsujuaq with respect to mine closure. While it meets the Quebec regulatory requirements for environmental issues, the existing closure plan does not address any of the social impacts of closure or directly address community concerns and values. As a result, together with assistance from the CPSC, participatory research was undertaken in the two Nunavik communities to bring them together and open lines of communication about the topic of mine closure. The goal is to contribute to a revised, collaborative mine closure plan that reflects Inuit values while ensuring regulatory compliance when the mine ceases to function.

The remainder of this thesis is divided into three chapters. Chapter 2 provides an overview of the key issues related to community engagement and social closure in the mining

sector. I will begin by discussing the history of mine closure by remarking on several Arctic mine case studies. Subsequently, the social and economic aspects of mine closure will be discussed, followed by the laws that outline mine closure practices in Nunavik, Quebec. In Chapter 3, I will revisit the methods used to undertake this research but will focus mainly on the results of the interviews, and how they relate to the current closure plan. In conclusion, Chapter 4 will highlight the implications of this study, and what future steps can be taken for the mining industry and community to improve the mine closure process.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

Mine closure can have major social and economic impacts on the communities involved. However, companies typically give very little, if any, consideration to these impacts, and current mine closure plans often do not address them (Lamb & Coakes, 2012). In addition, there is little to no related regulatory guidance provided. Consultation and communication related to closure and remediation planning with Indigenous communities also remains infrequent or uneven. Recent studies highlight the ongoing failures of the mining industry to implement social closure plans developed in consultation with local and Indigenous communities (Bainton & Holcombe, 2018; Xavier, Veiga & van Zyl, 2015; Stacey, Naude, Hermanus & Frankel, 2010).

This chapter demonstrates the increasing need for a social component in a mine closure plan in order for the closure to be successful. In order to establish the need for social closure plans in Northern Canada, this chapter delves into three separate Canadian Arctic mining cases. Although each case is different, they all provide lessons on the failure to plan for the social aspects of closure, indicating the need for community consultation and engagement. The case studies are followed by a definition and discussion of recent research on social closure that highlights the other major challenges communities face if these issues are not carefully planned for. As context for the discussion of Raglan Mine's closure planning in Chapter 3, the final section discusses the different agreements (e.g., the James Bay Northern Quebec Agreement) and laws (e.g., the *Mining Act*) that govern mining in the northern region of Québec, which also lack social considerations.

2.2. Understanding Mine Closure in the Arctic

The development of various mining projects began in the mid-twentieth century in the Canadian Arctic, bringing societal, economic, and environmental changes to many Indigenous communities. During this time, many Inuit were encouraged to seek employment in the mining sector to help reduce labour costs and turnover rates (Boutet, Keeling, & Sandlos, 2015). Inuit sought employment at different mine developments, leaving behind their traditional lifestyles (Keeling & Boulter, 2015). As mining resources are not infinite, the mines established in the Arctic during this time eventually closed—some sooner than others—putting the environment and quality of life of communities at risk. When they did, there was little to no closure planning, as there were very few regulations for mine closure. Mines that did prepare for closure through advance planning were limited in number, and as present-day reclamation plans fail to address community concerns, the assumption can be made that previous closure plans never did so either (Dance, 2015).

Rankin Inlet Mine, Nanisivik Mine and Asbestos Hill Mine are some of Canada's earliest Arctic mines. The story of these mines demonstrates communities' experiences with closure processes prior to closure regulations and illustrates the challenges of closure in Arctic and Inuit contexts. Each example had long-lasting negative legacies for the people and for the local environment. These case studies of "closure failure" provide significant lessons for communities, citizens, mining representatives, and government officials regarding failed closure practices, in addition to indicating areas for improvement in the realm of social closure planning.

2.2.1. Rankin Inlet, Nunavut

The first Arctic mine in Canada was established in Rankin Inlet. Although Rankin Inlet (Kangiqiniq) is the second largest settlement in Nunavut today, it started out as a small mining

settlement in the late 1950s (Cater & Keeling, 2013; Keeling & Boulter, 2015). The Rankin Inlet nickel mine was the first mine in the North to actively employ Indigenous workers (Keeling & Boulter, 2015). This was done in part because the Royal Canadian Mounted Police (RCMP) and federal government were looking for ways to ensure Inuit would not become a financial burden to the state; their involvement with the mine would help to ensure this by shifting them from fur trapping to wage labour (Keeling & Boulter, 2015). Inuit were employed at the mine in construction and trade work as early as 1953. When the mine officially opened in 1957, they became integrated into several other aspects of the mining operation. In 1958–1959, the caribou shortage made it impossible for Inuit to live off the land, forcing many to move to Rankin Inlet for employment at the mine. Soon enough, Rankin Inlet became a thriving community of approximately 600 people, both Inuit and non-Inuit. At this time, there was also a government office, a RCMP detachment, three religious missions, and a Hudson's Bay store in the settlement.

The mine only survived five short years, closing in 1962 due to depletion of resources and the decline in the demand for and price of nickel globally (Cater & Keeling, 2013). The rapid closure of the mine was a huge blow to the community, as many Inuit workers lost employment (Cater & Keeling, 2013). While in operation, the mine had caused many changes to the community of Rankin Inlet, such as English becoming children's first language, changes to social activities, and the loss of traditional ways of living like that of hunting and trapping (Cater & Keeling, 2013; Rodon & Levesque, 2015). Outmigration also occurred as people went to find work at other mines in the North, but many returned home unsuccessful. According to Cater and Keeling (2013, p.65), "the community fell into a period of welfare dependency and haphazard

government assistance, with the landscape scarred by the ruins and waste associated with rapid deindustrialization."

Initial efforts to prepare for mine closure were disorganized and ill-considered, although the government had begun to encourage such planning as early as 1959. Various reports were prepared and conferences were held, but the plans never went beyond paper and were never fully executed. Instead, the mining company and Qallunaat workers sold the infrastructure and walked away from the mine site once operations came to a halt (Keeling & Boulter, 2015). Closure regulations were non-existent and therefore, no environmental planning took place. Although they were working Canadian citizens, many Inuit miners were excluded from unemployment insurance benefits; this was a deliberate policy intended to force them back to their traditional lifestyles (Keeling & Boulter, 2015). However, many no longer had the equipment and tools, including sled dogs (Cater & Keeling, 2013), which would allow them to return to land-based activities. While many Inuit wanted to return to a more traditional lifestyle, others wanted to continue pursuing wage-labour opportunities or a balance of both. Some workers from Rankin Inlet were transferred to other mine projects around the country with the assistance of Northern Affairs officials (Keeling & Boulter, 2015). However, this also resulted in the separation of workers from their families, and many struggled to adjust to their surroundings (Keeling & Boulter, 2015). After the closure, the government also sponsored arts and crafts initiatives, as well as canning enterprises, which provided income to some of the families who were struggling (Keeling & Boulter, 2015). The relocation of the Keewatin Region administration in the 1970s to Rankin Inlet helped to rebuild the struggling community as the population was declining due to the closure of the mine (Boutet et al., 2015).

Remnants of the mine, including the original mine building and the shed used to store nickel concentrate, still surround Rankin Inlet (Cater & Keeling, 2013). The headframe of the mine remained until the 1970s, when it burnt down. Prior to its burning, the headframe was seen as a landmark, and a symbol of the industrial history of the community of Rankin Inlet. As a result, residents have discussed rebuilding the headframe as a way to communicate the importance and significance of the mine to tourists (Cater & Keeling, 2013). The unreclaimed tailings pile, which had been a concern in the area for over 30 years due to the acidic metal leachate flowing into Hudson's Bay and the orange tailings dust blowing through town, was finally dealt with in 1990s (Cater & Keeling, 2013; Meldrum, Jamieson, & Dyke, 2001). At this time, contaminated soil was discovered, which led to environmental studies and eventually to the capping of the tailings and contaminated areas (Cater & Keeling, 2013). The area continues to be monitored to ensure safety for the people of Rankin Inlet and for the environment. More recently, a new gold mine has been developed in the region, eliciting negative memories about the former nickel mine that are related to the environment and to post-closure employment (Cater & Keeling, 2013). Although many Inuit refer to the Rankin Inlet era as a "better time," because people had more money as a result of employment resulting in a better quality of life, there are still negative experiences associated with the mine and its closure.

Though long-closed, Rankin Inlet provides lessons that can be learned to improve the future closures of other mines. As noted, the mine closure caused an economic crisis for the community, and it became difficult for Inuit to find employment. They no longer had a means of earning income, and many had sold their hunting equipment. The failure of the mine company to restore the land also had adverse effects on Inuit, who held and continue to hold strong ties to that land. The post-closure employment and environmental situations were instructive for all

parties. Inuit learned that mines are not an infinite source of income and will at some point cease operations when resources run out, an eventuality that must be prepared for. Industry and government were encouraged to take responsibility for helping those employed by the mine to find an alternate source of income, while new regulations were introduced regarding the environmental management of a mine site (Cater & Keeling, 2013).

2.2.2. Nanisivik Mine, Nunavut

The Nanisivik Mine, located on north Baffin Island 750 kilometers north of the Arctic Circle, was Canada's first high-Arctic mine (Bowes-Lyon, 2006; Lim, 2013). Opened in 1976 and operated for 26 years, the Nanisivik mine was the first major industrial development in the eastern Arctic—what is now Nunavut (Bowes-Lyon, 2006; Lim, 2013; Midgley, 2015). The mine was constructed 30 kilometers outside of Arctic Bay, a small Inuit hamlet founded in the mid 1900's (Bowes-Lyon, 2006; Lim, 2013). The federal government was hopeful that opening a mine site would attract Inuit to the workforce, and provided support for the mine development contingent on the promotion of Inuit employment (Burns & Doggett, 2004; Midgley, 2015). Accordingly, the mine was to have a workforce that was 60% Inuit. However, that percentage never exceeded 30%, and decreased to 9% in the mine's final years (Burns & Dogget, 2004; Midgley, 2015). Although the number of Inuit employees was limited, the Nanisivik Mine was the largest employer in the region (Lim, 2013). Employment at the mine increased employees' disposable income, which resulted in an improvement in the standard of living for employees and their families living in Arctic Bay (Bowes-Lyon, 2006).

However, similar problems as those detailed in Rankin Inlet accompanied the closure of the Nanisivik Mine decades later. In 2001, the mine announced it would close, raising deep concerns for the Inuit employees and the community of Arctic Bay (Lim, 2013). A

socioeconomic impact study was conducted, and community members were given the opportunity to voice their concern about the legacy the mine would have for them (Bowes-Lyon, 2006). There were major anxieties expressed about the environmental impacts of mining. Many expressed their fears about the tailings cover and runoff, referring to it as poison water (Midgley, 2015). Inuit were concerned about the health of the local wildlife and the land, as the tailings' acid mine drainage affected ringed seals and the shipping of ore from the mine was found to scatter narwhal, both important species to Inuit culture and food systems (Midgley, 2015).

Usage of the buildings and infrastructure at Nanisivik was also of great concern; Inuit feared it would all be demolished and buried along with the mine (Lim, 2013). Residents of Arctic Bay pleaded with the government to find alternative uses for the site, or to transfer the much-needed infrastructure and buildings to the community, since infrastructure development for the town of Arctic Bay had been held back due to the proximity of Nanisivik (Brubacher and Associates, 2002). The Government of Nunavut held public hearings to gain Arctic Bay's input and determine what to do with the infrastructure and community center established at the mine site (Bowes-Lyon, 2006). In 1998, ten houses were moved from the site, retrofitted, and made available to few Arctic Bay residents as a pilot project (Brubacher and Associates, 2002). In 2005, the Government of Nunavut stated that no more houses would be moved, making it unclear how many were left behind. Instead, the Nanisivik site would be torn down, mostly due to concerns about contamination (Bowes-Lyon, 2006). In spite of pleas from residents of Arctic Bay, when the mine ceased operations, over $50 million worth of infrastructure was demolished at the Nanisivik mine site.

The Nanisivik case provides a perfect example of how a mine closure can fail due to inadequate consultation and lack of understanding. As the mine site announced its closure a year

before it took place, the Government of Nunavut Minister for Sustainable Development reassured the public that there was lots of time to develop a plan for closure (Lim, 2013). Subsequently the Government of Nunavut acknowledged the pleas from Arctic Bay to keep transportation infrastructure intact, to find alternate uses for the site, and to transfer housing from the site to Arctic Bay. Fears that the Nanisivik site would be demolished and buried alongside the mine were real (Lim, 2013). Although community members voiced their concern with the government and industry since closure was announced in 2001, and later at a meeting in January 2002 with government officials, little progress was made (Lim, 2013). As Bowes-Lyon (2006) has pointed out, many of the concerns and desires of the community remained unaddressed during the closure process. In addition, language barriers created challenges; translations of Inuit concerns were often partial or inaccurate. For example, words such as "contamination," which featured heavily in discussions of the demolition of infrastructure, were improperly understood (Lim, 2013). Although a committee was developed to address the potential socioeconomic impacts of closure, differences in cultural assumptions and approaches meant that opportunities for effective communication between the industry, government and residents of Arctic Bay were consistently missed. The repurposing of the infrastructure might have preserved valuable assets that would help mitigate the economic impacts of closure. Such infrastructure could have been used for alternative economic development and employment opportunities which were blatantly ignored. Unfortunately, the unsuccessful closure of the mine continues to haunt the community members of Arctic Bay (Lim, 2013).

2.2.3. Asbestos Hill, Nunavik

The mine closure experiences at Rankin Inlet and Nanisivik resulted in economic hardships, long-term environmental problems, community crisis and outmigration, and have

contributed to negative perceptions of mining for many. The case of the Asbestos Hill (Purtuniq) mine in Nunavik illustrates similar negative legacies of mine closure that are particularly pertinent to this study. Located proximal to the Raglan Mine site, the Asbestos Hill mine was opened in 1972; it was the first mine in the Nunavik region and the first fly-in, fly-out operation in Canada. It has had a major influence on Nunavik Inuit and their perceptions of mining and remediation due to its poor closure measures, which in turn affects the way mining is undertaken in the region today.

The construction of the Asbestos Hill (Purtuniq) mine, which included excavation, development of access roads, bunkhouses, warehouses, an airstrip and the development of a port at Deception Bay on the Ungava coast, took place between 1964 and 1972. Operated by the Quebec company Société Asbestos, the mine development included an open pit, processing mill, and a warehouse at Deception Bay the size of five football fields, with a maximum capacity of 225,000 tons of asbestos fibers. The mine employed 400 men at one time, of whom 10 to 40 were Inuit. Several of the Inuit employees came from the nearby communities of Salluit and Kangiqsujuaq. Although many Inuit were from local communities, they worked long rotations, unable to see their family and friends. However, according to recent oral histories, many Inuit workers appreciated their experience at the mine, as it allowed them to become skilled in the operation of machinery and gain knowledge of mining (Carney, 2016).

The operation was short-lived, however. Between 1979 and 1983, the price of asbestos dropped and exports decreased due to the fact that the fibers were identified as carcinogenic, causing asbestosis, mesothelioma and lung cancer. The last shipment of asbestos fibers from the mine was made in 1983, and the operation shut down in 1984 (Carney, 2016). As closure was abrupt, there was no plan in place and some Inuit found themselves unemployed, although by the

time of closure there were fewer Inuit workers. However, the majority understood that there was little they could do to stop the mine from closing down, and felt proud of the new skills their work at Asbestos Hill had allowed them to develop (Carney, 2016). In fact, according to Carney (2016), many Inuit looked at the Asbestos Hill mine as a positive experience, and one that enabled them to gain new employment at Raglan, which opened shortly thereafter (Figure 2.1) (Carney, 2016).

At the time of the closure and abandonment of Asbestos Hill, few policies regarding reclamation and restoration plans for mine closure existed. The absence of such guidance meant that no remediation efforts, leaving behind contaminated tailings and infrastructure. No monitoring of the environment or wildlife took place. During the late 1980s and early 1990s, concerns grew about the contamination of the environment and wildlife at Deception Bay and the mine site itself. Community members, especially from Salluit, were concerned about the impacts of asbestos fibers on fish and marine mammals (Poirier & Brooke, 2000).

In 1989 Quebec's MERN ordered an inspection of the site. The inspection found that most infrastructure was still intact, with only valuable equipment and materials recovered (Roche, 1992). Subsequently, the infrastructure that was left behind became weathered and vandalized (Roche, 1992). There was an open-pit mine of 800 feet in depth, open tailings and waste rock piles, buried garbage, and ore dumps. Subsequently, a reclamation plan was prepared by Falconbridge Ltd. (the company developing the nearby Raglan Mine) and implemented in 1994. Although the company spent $3 million over seven years, reclamation efforts remain incomplete to date, and Asbestos Hill continues to pose negative environmental, social, and health effects on the nearby communities of Salluit and Kangiqsujuaq (Carney, 2016). Finally,

in 2019 Quebec added the site to the list of abandoned mine sites that need to be reclaimed by the provincial government. Current reclamation is being conducted by Quebec's MERN.

2.2.4. Summary

Although the case studies discussed here illuminate experiences in different contexts, they all offer lessons that can be applied in future mine closures. The Rankin Inlet case study demonstrates how poor closure has negative impacts on the environment and the community. In that instance, many people had lost their jobs causing them to revert back to their traditional lifestyles or look to the government for new employment opportunities. However, this was not easy, as many Inuit workers had sold their hunting equipment and gotten rid of their sled dogs, thinking that they would have long-term employment at the mine. Not only that, but contamination from the mine due to improper tailings management resulted in their feeling distrust toward the resource development industry.

The Nanisivik case shows that proper and constant communication is necessary for closure planning to be successful. Many residents of Arctic Bay had communicated that they wanted the abandoned mine infrastructure for their town, but instead, millions of dollars of that infrastructure were torn down. Poor communication and knowledge translation led to the improper usage of the abandoned mining infrastructure. Finally, Asbestos Hill confirms the need for regulatory guidance on proper closure procedures, as the many negative environmental legacies led to distrust towards the government and mining companies. In fact, Asbestos Hill is still undergoing reclamation to repair the site and restore the environment to its original condition. It is now expected that the Inuit of Kangiqsujuaq and Salluit will be continuously consulted and kept up to date on reclamation activities being undertaken by MERN at Asbestos Hill.

These case studies are examples of how poor planning can result in negative mine closure outcomes and experiences for local communities, especially at remote Arctic mine sites. In each case, local communities affected by the mine became reliant (to some extent) on the industry for employment and economic support. This situation continues elsewhere today, as the Nunavik Inuit are also heavily dependent on the Raglan Mine for employment and economic development. When it closes down, the economic opportunities it offers will disappear and will need to be found elsewhere. However, that will be challenging due to the remoteness of the region. Regardless, Inuit continue to pursue land-based activities, underscoring the importance of proper environmental remediation for the social and economic well-being of communities. While mine closure regulations and practices have changed considerably since the closure of these historic mines, these experiences point to the necessity for careful planning for the social, economic, and environmental impacts of mine closure in the North (Dance, 2015; Rodon & Levesque, 2015).

2.3. Defining Social Closure

These historical experiences as well as growing concerns about the impacts of mine closure are increasing the attention paid to both the social and environmental aspects of closure by industry and government—and not only in Canada. The International Council on Mining and Metals ("ICMM") developed guidelines for mine closure (including integrated mine closure and land rehabilitation guidelines) in 2019, but these guidelines still fail to address the social side of closure. According to the Centre for Social Responsibility in Mining ("CSRM"), "existing literature tends to focus on adverse impacts of mine closure," as it is understood that economies can decrease when the mine closes causing adverse effects on schools, employment, and housing to name a few. Therefore, a better understanding of the social aspects of mine closure is still

required (Bainton & Holcombe, 2018b; Kemp et al., 2007, p. 2). The current scholarship also neglects to document industry experiences with closure that have been exemplary, whether or not they include its social aspects (Bainton & Holcombe, 2018b; Costa, 2015). Therefore, there are significant gaps in our understanding of the social aspects of closure in comparison to the more extensive literature on the environmental facets of mine closure. Furthermore, most closure plans remain silent on the socioeconomic aspects of mine closure (Kemp et al., 2007). Indeed, recent studies characterize closure plans in Canada and Australia as inadequate (Bainton & Holcombe, 2018; Monosky & Keeling, 2020).

Communities with a history of mine closure demonstrate that the many socioeconomic aspects which need to be considered when developing a closure plan are frequently ignored. This results in adverse effects on local economies, contributes to impoverishment, triggers the loss of key services, and leads to outmigration (Bainton & Holcombe, 2018). Stacey, Naude, Hermanus, and Frankel (2010) outline some of the social impacts of closure, including "inappropriate training for self-employment, the failure of job creation schemes, the illegal occupation of houses, and vandalism of infrastructure and facilities" (p. 379). As Xavier et al., (2015) demonstrate, a closure plan that is inadequate does not support communities in surmounting the consequences that result from mine shutdown. Even in cases in which socioeconomic aspects of mine closure are considered in past or current plans, their articulation is poor and initiatives to help the community overcome the consequences of closure remain unimplemented (Xavier et al., 2015). However, some of these consequences can be eliminated, or their severity mitigated, when mine closure is properly integrated from an early stage of mine development. Thus, relationships between the company, community, government, and stakeholders are vital to determining the social and economic outcomes of closure (Stacey et al., 2010). As a result, an

entirely new genre of closure planning is required, one that acknowledges the environmental side of closure, but also gives equal emphasis to the examination of and planning for economic and social closure issues. This is referred to as *social closure* (Burns & Church, 2018).

According to Haney and Shkaratan (2003), there are four main areas of impact that need to be addressed when developing a social closure plan. First, **loss of employment** is one of the most serious and persistent consequences of mine closure. When a mine shuts down, communities lose access to stable jobs with higher salaries, resulting in a decline in living standards. This has economic impacts throughout the community and region. Therefore, the loss of employment and its repercussions need to be taken into consideration when developing a social closure plan. Second, the mining company must anticipate any changes to **municipal and social services** resulting from the mine closure. Haney and Shkaratan (2003) identify housing and communal services and infrastructure as often negatively affected by closure, contending that these changes need to be addressed by social closure plans and alternative solutions developed to balance out their loss. Third, impacts on **community cohesiveness** after mine closure are key elements of a social closure plan, as most remote communities are fragile and vulnerable to swift changes such as outmigration, and will therefore struggle to adapt in the absence of the mine operation. Haney and Shkaratan (2003) note that inadequate social closure plans can lead to alcohol and drug abuse, domestic violence and/or pervasive feelings of despair and hopelessness. In fact, sadness and distress increase as well throughout many families a result of mine closure (Pini, Mayes, & McDonald, 2010). Finally, **the environment** needs to remain a central focus of the social closure plan, but not to the detriment of social planning for loss of employment, changes to municipal and social services, or threats to community cohesiveness (Monosky & Keeling, 2020). As defined by Bainton and Holcombe (2018b), the process of

closure includes the development of various episodes - or individual closure plans. Such episodes need to address all aspects of closure, including the social impacts. Therefore, multiple closure plans can be developed on different facets: environmental, technical, and social. Noting that some of the greatest impacts of mining occur during the closure process, no documentation exists that details the implementation of such a comprehensive closure plan (Bainton & Holcombe, 2018b; Lamb & Coakes, 2012; Xavier et al., 2015). In fact, social closure plans tend to get overshadowed by environmental and technical plans that are deemed more important (Beckett, Dowdell, Monosky & Keeling, 2020). A social closure plan is based on several factors that will differ from mine site to mine site. Plans must consider location, local history, environment, and the relationship between stakeholders (Beckett et al., 2020). Clear and stringent policies to guide companies to develop a social closure plan fail to exist (Beckett et al., 2020). This leaves impacted communities unbuffered from the inherent social impacts of mine closure. If no guidelines exist and no examples are documents regarding a social closure plan, how can a company understand the importance of this requirement?

A social closure approach has the potential to result in a resource-extraction industry that effectively manages the fallout from its initial presence and final absence from both the landscape and the social context. Not only does social closure planning benefit the community, it also benefits the industry, as it results in a positive reputation, leading to support for future projects from communities and governments (Xavier et al., 2015). Stronger local support develops under circumstances in which communities are engaged and feel that their concerns are addressed. In addition, the industry and community are able to adequately prepare for a closure in which they can better manage the resulting changes. Finally, through continued engagement

and collaboration with communities, the industry is able to follow through with its commitments for responsible environmental and social performance (Burns & Church, 2018).

2.4. Mine Closure Regulation in Nunavik, Quebec

In the Canadian context it is important to note that the remoteness of northern communities associated with mines creates greater challenges than those of mining projects in more southern areas. According to Sandlos and Keeling (2012, p.9) “very few northern mining communities have managed to reinvent themselves and cope with closure.” Many of these communities are adversely affected by dramatic and deep employment and population losses that linger for many years after closure (Rheaume & Caron-Vuotari, 2013). When a mine develops in a remote area, the community becomes highly dependent on the mine for its economy, producing greater impacts of closure outcomes than those in communities that are more regionally and nationally integrated, and therefore more independent and buffered from mine closure impacts (Bainton & Holcombe, 2018b).

Mine developments can completely transform economies, society, and the cultures of the local and Indigenous communities (Horowitz et al., 2018; Sumi & Thomsen, 2001). For instance, the mixed economy of Nunavik includes wage labour and the participation in traditional activities such as hunting, fishing, gathering, and trapping for economic stability (Rodon & Schott, 2014). Employment at the mine removes Inuit from their communities, where their participation in traditional activities becomes more limited, decreases time available to teach youth about Inuit culture, and contributes to the loss of Indigenous language (Caron, Asselin & Beaudoin, 2019; Monosky, 2020). Prior to the mine development, many Nunavik Inuit depended on the health of the environment for their livelihoods. However, the environment has been impacted since the development of the mine (Sumi & Thomsen, 2001).

The remoteness of the Nunavik communities which are accessible only by plane, poses several other economic challenges (January & Lee, 2019; Roberston & Blackwell, 2014; Sandlos & Keeling, 2012). Many industries do not want to have the financial responsibility of the high costs associated with the transportation and infrastructure requirements for remote and isolated regions (Sumi & Thomsen, 2001). As there are few other economic resources available for Inuit to find employment, it makes it much more difficult to recover and find yet another, stable income. For example, the construction sector in Nunavik declined dramatically in 1991, and has not been able to recover since (Rodon & Schott, 2014). For these reasons Nunavik is particularly vulnerable to mine closure in comparison to more southern areas.

The regulatory context for mine closure in Quebec and Nunavik, including the agreements and legislation in Quebec, has shaped the contemporary mining industry in the region. In the twentieth century, many hydroelectric projects flooded Indigenous lands, without any acknowledgement of their presence or compensation for destroying their lands (Rodon, 2018). Such colonial experiences over the last 40 years have compelled the Inuit of Nunavik to become creators of their own political and economic administrations (Fabbi, Rodon, & Finke, 2017; Rodon, 2014; Telewiak, 2001; Wilson, 2017). Although they are not an official self-governing region, Nunavik has become a leader in governance innovation (Wilson, 2017). One of the most important steps achieving this was the development and signing of the 1975 JBNQA, which removed Inuit lands from federal jurisdiction and placed them under that of the provincial government (Bone, 2017; Wilson, 2017; JBNQA, 1975). However, the JBNQA has only given limited administrative sovereignty to Inuit as they still fall under Quebec laws (Rodon, 2014). In fact, the agreement established various government authorities that have particular roles in the region. Notable however, is that the JBNQA was the first modern treaty in Canadian history,

and was developed as a result of Indigenous peoples' struggle with industrial developments in the far north of Quebec (Wilson, 2017).

The JBNQA helped to establish different government bodies that aid in the governing of mining developments throughout the province. It also brought about a new land regime, which is managed by those affected and by the government responsible. This new regime divides Nunavik territory into three categories: I, II, and III (JBNQA, 1975). The largest portion of the land is in Category III, that is provincial jurisdiction. However, they can continue to use the land for their traditional lifestyles, which include hunting, fishing, and trapping (JBNQA, 1975). Category II lands also allow for Inuit to continue their traditional lifestyles with no special right of occupancy. However, the government of Quebec is able to carry out surveys, studies, and administrative work, among other things, on these lands. If the government of Quebec decides to develop on said lands, then the lands must be restored (JBNQA, 1975). Category I lands, which are primarily those in and around their communities, are strictly for Inuit use. Here, local matters are managed by those living in each community. Mining projects on Category I land require consent from the Inuit, but the mineral and subsurface rights belong to Quebec (JBNQA, 1975, Rodon, Levesque, Grenier & Keller, 2014).

The regional and local authorities relevant to resource development in Nunavik include Makivik Corporation, KRG, and local LHC's, which are all responsible for making appropriate decisions on behalf of the Nunavik Inuit. As an outgrowth of the JBNQA, Makivik—which means "to rise up" in Inuktitut—Corporation was created in 1978 (Fabbi et al., 2017; Makivik Corporation, 2014; Wilson, 2017). Makivik is the region's economic development corporation; it administers funds from land claims and subsequent agreements, and manages and invests these funds for the long term (Wilson, 2017). Makivik is an administration for the beneficiaries of the

JBNQA (i.e. the Inuit of Nunavik) ensuring that Inuit priorities and needs are respected by the provincial and federal governments. The corporation aims to promote the health of the Inuit region economically, socially, and culturally (Wilson, 2017). Makivik Corporation is governed by 21 directors selected by the adult beneficiaries of each community (Lewis & Brocklehurst, 2009; Makivik Corporation, 2014). The corporation is located in Kuujjuaq, and owns three businesses: Air Inuit, First Air, and Halutuk Enterprises (Fabbi et al., 2017). Makivik is also the administration that deals with the rights of the Nunavik Inuit in relation to development proposals, including mining (Lewis & Brocklehurst, 2009; Makivik Corporation, 2014). Makivik also handles any of the financial compensations that came from the JBNQA and invests in community projects and other related developments (Wilson, 2017). By contrast, the Kativik Regional Government, KSB, and NRBHSS are institutions of public government.

The JBNQA also led to the establishment of several agreements that govern natural resource development in the region. The signing of the JBNQA encouraged the signing of the Sanarrutik Agreement on April 9, 2002 (Makivik Corporation, 2014; Makivik Corporation, 2014b). The Sanarrutik Agreement was established to continue economic and community developments in the Nunavik region, and to facilitate the growth of the natural resource industry without posing a threat to Inuit lifestyles (Makivik Corporation, 2014b).). As Nunavik is seen to have huge potential for mining and hydroelectric developments, the Sanarrutik Agreement, made between Makivik, the KRG, and the Government of Quebec, was mainly established in order to ensure Inuit participation in these developments. In fact, the Quebec government provided funding to Makivik and KRG to promote Inuit participation in future natural resource developments, specifically mining (Makivik Corporation, 2014b).).

Nine years later, in 2011, Quebec diverged from this agreement and adopted Plan Nord, a provincial strategy for the development of natural resources in Nord du Quebec (includes regions north and south of Nunavik), without the consultation of Indigenous people (Fabbi et al., 2017; Makivik Corporation, 2014). Plan Nord was established to generate new economic development for the region while protecting 50% of the territory. Although the plan covers tourism, biodiversity preservation, and forestry, its main focus is to capitalize on mineral development during the current boom (Rodon, 2017).

In response to concerns over the creation of Plan Nord in 2012, the various government administrations of Nunavik worked together to develop the Report representing the voice of the Nunavik Inuit, covering all the fundamental issues they face (Rodon, 2017). The Parnasumautik consultations took place in 2013 and the report was released the following year. Nunavik aimed to "identify Nunavimmiut's visions of development and priorities over the next 25 years" (p. 85). The report presents itself a "portrait of Who We Are, Our Communities and Our Region. It defines a vision of the future that includes greater control of planning and governance for Nunavik Inuit" (p. 11). Through this report, Nunavimmiut voiced their concern over mining initiatives that prioritized workers from outside the region and voiced their need for infrastructure development. They also raised concerns about the impacts that mining has on traditional activities, which can lead to mental health problems, including addictions and suicide. Communities also highlighted the socioeconomic inequities produced by the few salaried Nunavik workers employed by the mining industry, who benefit while other community members do not.

These initiatives all encourage economic growth in Nunavik, including the sustainable development of mining projects. However, the issue of mine closure remains to be a major

sustainability challenges for the mining industry; these initiatives guiding development in Nunavik don't take into account all possible negative outcomes related mine closure.

The mining and environmental governance regime in Nunavik intersects with several different legislative frameworks that shape the mining industry within Quebec—primarily the Mining Act—yet these laws do little to address the social dimensions of closure issues. The Mining Act "promote(s) prospection, research, exploration, and development" in line with sustainable development practices, while noting that natural resource development is not the sole use of land in the province (Government of Canada, 2018, p.3; Investing, 2018). As many Indigenous communities use Quebec lands for a variety of reasons, the Mining Act aims to communicate with these communities in order to increase the social acceptability of many of these projects by individual communities. This is mainly done through:

- A First Nations chapter dedicated to consultation and policy regarding the mining sector.
- Public consultations for metal-mine projects that produce less than 2,000 tons per day.
- A monitoring committee to involve and employ local communities.
- Closure plan approval before a lease is issued.
- A financial guarantee for the closure plan that is paid in full within the first two years of the plan approval.
- A yearly report discussing the amount and value of the ore mined, along with the royalties paid to each province.

However, the role the Nunavik government plays in closure planning is quite limited (Monosky, 2020). In fact, Quebec's MELCC and their MERN govern mine closure in Nunavik (Monosky, 2020). There is also the KEQC and the Kativik Environmental Advisory Committee ("KEAC") which are important aspects of the self-governing structure of Nunavik. In fact, the

KEQC reviews the closure plans submitted by mining companies in the province before they are given to the Quebec government for approval. The KEAC acts as a consultant to provincial and federal governments with respect to environmental and social issues in Nunavik. As documented in the Nunavik Inuit Mining Policy (developed by Makivik Corporation), mines in Nunavik must undergo an Environmental and Social Impact Assessment ("ESIA") (Makivik Corporation, 2014). However, this policy only specifies that mineral exploration and extraction must go through an ESIA, not specifically closure (Makivik Corporation, 2014). The KEQC is and remains to be the only regional authority that has a role in closure planning by review of the closure plans. Makivik Corporation and KRG have the option to sit on committees that discuss closure, although this is at the discretion of the mining company and is not governed by Quebec law (Monosky, 2020).

General mine closure requirements are outlined by the MERN, whose job is to manage Quebec's land and natural resources. The Mining Act originally established in 1987 governing mining in Quebec had no mention of a closure plan requirement. However, the 1995 amendment required a closure plan be produced and a financial guarantee be secured. The Mining Act was refined again in 2013 that requires a closure plan be developed and approved before a lease is given and 100% of the estimated costs for closure (Monosky, 2020). The provincial government's Guidelines for Preparing Mine Closure Plans in Quebec state that remediation must meet social objectives, but do not define any related criteria (Monosky & Keeling, 2020). Closure regulations are also not clear about how affected Indigenous communities should be involved in closure planning, which hinders the involvement of these groups (Monosky & Keeling, 2020). The ministry's responsibilities relate to revegetation, contaminated land, buildings, infrastructure and equipment, securement of excavations, accumulation areas, water

collection systems, mining effluents, groundwater, sanitary installations, petroleum products, waste, and quarries and sand pits. Therefore, all of the aforementioned components must be included in the final closure plan as required by the Mining Act, if applicable. Division III, Section 232.2 of the Mining Act states that a rehabilitation and restoration plan must be submitted and approved by the Minister before any mining activities begin (Government of Quebec, 2018). Section 232.3 (p.55) specifies the components of a rehabilitation and closure plan for a mine, which include the following:

- The various activities that will be carried out to restore the land to its satisfactory condition. If the mine includes tailings, a containment plan must be provided, and measures to prevent environmental damage must be developed (Mining Act, 2018). It is the prerogative of the MERN and the MELCC to decide whether or not the restoration requirements have been met successfully (Government of Quebec, 2018). In line with the MERN, the MELCC is in charge of environmental policy and land development for the province of Quebec.
- The plan must include the various activities that will be carried out to restore the land to its satisfactory condition once the mine ceases operations. If progressive rehabilitation and restoration work is to be undertaken, the plan must describe the conditions and varied phases of completion (Government of Quebec, 2018). In fact, progressive reclamation is encouraged and should be prioritized for all mining developments. If progressive reclamation is not stated, the closure plan must explain why (Quebec MERN & MELCC, 2017).
- A detailed financial estimate for the expected closure costs. Per Section 232.4, these costs must include that of a financial guarantee to cover the fees associated with the

rehabilitation and closure (Government of Quebec, 2018). This guarantee requires the mining company to cover 100% of the restoration costs, and must be supplied within the first two years after the plan is approved. The first payment, at 50%, has to be made within the first 90 days of plan approval, and the subsequent payments of 25% are to be made on the anniversary of the plan approval (Government of Quebec, 2018). The Quebec Mining Association ("QMA") (n.d., para. 1) also states "mining companies [are] responsible for 100% in costs of site restoration and requiring them to deposit 100% of the financial guarantee needed to cover these costs. The mining company is legally responsible for rehabilitating and restoring its mine site."

- In the case of an open-pit mine, a backfill feasibility study and a cost-benefit study must be completed (Government of Quebec, 2018; Quebec MERN & MELCC, 2017). The type of backfill used for the open pits must be defined as either unconsolidated deposits, mineral substances, tailing or waste rock; any other type of material has to be justified and accepted by the MERN and MELCC prior to usage (Quebec MERN & MELCC, 2017).

Section 232.6 of the Mining Act states that the rehabilitation and restoration plan should be revised and submitted to the Minister every five years, whenever amendments are made or intended to be made, and whenever the Minister sees fit to request a revised plan. As previously mentioned, before mining permits and licenses are issued, a closure plan is to be developed and approved. If mining operations stray from the original operations and amendments need to be made to the closure plan, those amendments must be submitted for approval (Government of Quebec, 2018). Subsequently, the closure plan will include the monitoring and maintenance measures that will be undertaken that can range anywhere from five to 100 years (The Canary

Institute for Mining, Environment and Health, n.d.). However, as closure requirements are still fairly new, there is no information on the monitoring and maintenance of closure plans and their success (or failures) for a one-hundred-year period.

Although mine closure plans are now required in Quebec, and closure guidelines specify that social objectives must be met, there is no specification on how to do so. More specifically, no social impact assessment is required for the closure of a mine under the Nunavik Inuit Mining Policy, although one takes place prior to development and during operations. Furthermore, little guidance is provided to Nunavik Inuit on how to examine and plan for economic and social closure issues (Monosky, 2020)

2.6. Conclusion

Historical case studies of mine closure in the Canadian Arctic are excellent examples of how mine closure activities that do not engage with local communities result in poor practices, as well as weak relationships between the community, government and the resource development industry. Nanisivik Mine, Rankin Inlet Mine and Asbestos Hill Mine were all failed attempts at mine closure, resulting in disorganized and incomplete reclamation to date and producing negative perceptions of the mining industry. Such lessons provide useful insights for community engaged closure planning today.

This chapter dove into the concept of social closure, and the impacts that result when a social closure plan is not developed. As discussed, there are four main areas that are impacted when a mine ceases operation: employment, municipal and social services, community cohesiveness and the environment (Haney & Shkaratan, 2003). Although the environment has become the main focus of many closure plans, the other major aspects of closure such as

employment, are often overlooked resulting in lasting impacts to the economy and individuals quality of life (Bainton & Holcombe, 2018b; Beckett et al., 2020; Lamb & Coakes, 2012; Xavier et al., 2015). The development of a social closure plan is therefore important but, essential to note is that plans established can only be used as a guide as no two closure plans are the same. Each closure plan is unique and developed based on various factors including location, local history, the environment and the relationship between stakeholders (Beckett et al., 2020). However, all closure plans should share the commonality of accounting for community concerns which will establish stronger local support, benefiting the community and industry (Xavier, 2015). Although mine closure may be the most costly phase of the mining cycle, it is also the phase that has the greatest impacts that need to be addressed.

As Nunavik is highly sought after for its mineral abundance, there is huge opportunity for the growth of extractive industry in the region. However, current mines will eventually close and require a closure plan. General mine closure requirements are outlined by the MERN, whose job is to manage Quebec's land and natural resources. The requirements provided by the MERN indicate technical, environmental, and social objectives for closure although the latter are not specified in the document. That closure plan has to be approved before mining development and operations begin. However, closure plans need to address the social and economic aspects of closure to be appropriate and approved by impacted communities. As the following Chapter shows, the existing closure plan for Raglan Mine focuses on the environmental aspects of closure, discussing the dismantling of infrastructure, tailings management, and water treatment to ensure contamination is mitigated in these areas. However, the mining company has been working alongside the communities of Salluit and Kangiqsujuaq and other industry experts, by

way of the CPSC, to incorporate the social aspects of closure into the creation of Raglan Mine's next closure plan.

CHAPTER THREE: RESULTS

3.1. Introduction

The literature reviewed for this research aims to thoroughly addresses the need for a social closure plan, yet few closure plans have been documented that actually include social and economic aspects. In Quebec, there is little regulatory guidance provided on how to proceed with a social closure plan. The Raglan Mine located in Nunavik, Quebec is predicted to close in 2041 as it was recently approved to construct new mines to extend the life of the mining project, and the current mines will gradually cease operations. Currently, the existing closure plan for Raglan Mine does not address the social impacts that closure may have on the Inuit communities of Salluit and Kangiqsujuaq. However, in order for successful closure to occur, the closure plan requires the development of a social component that incorporates community engagement. Therefore, the Closure Plan Subcommittee (CPSC) has been developed to bring together Raglan Mine, Inuit and industry experts in an attempt to develop a closure plan that satisfies all parties involved.

Using semi-structured interviews with community members of Salluit and Kangiqsujuaq and a review of Raglan Mine's current closure plan, this chapter seeks to document the values and priorities that are most important to community members, and how the closure plan can incorporate those priorities. Specifically, this chapter will answer the following questions:

1. What are the most important concerns of community members to be incorporated into the closure plan?

2. What would be an ideal closure plan for the mine, as described by community members?

3. What aspects of the local environment are most important to the community, to help prioritize steps for closure?

4. How can community engagement be improved to ensure proper communication about mining activities in the region, including that of mine closure?

This research was designed with the assistance and oversight of the Raglan CPSC, and with the overall goal being to apply this knowledge to the next version of the Raglan Mine closure plan. The results of this chapter show that participants have a definite plan for the use of infrastructure post-closure, and clear priorities when it comes to protecting the environment and wildlife. However, there is no clear understanding of how participants want to deal with mine waste or employment once the mine closes down. While some of these issues (such as infrastructure) are addressed in the Raglan Agreement, the current Raglan Mine closure plan, while compliant with Quebec regulations and guidelines, does not clearly reflect the priorities of Nunavik Inuit. However, the results of this research will inform the CPSC's efforts to integrate Inuit priorities more directly into the future closure plan.

This chapter begins with a contextual review of the Raglan Mine closure plan, in order to provide a basis for understanding the results. This will be followed by a detailed summary of the research results. Chapter 4 will further discuss the results and their implications, explaining their importance and how they can be applied to the current closure plan.

3.2. Context: Raglan Mine's Closure Plan

The most recent closure plan for the Raglan Mine was prepared by SNC-Lavalin and submitted to the Quebec government in 2018. It meets all of the regulations set out by the government of Quebec, and thus was approved by the government in 2019. However, according

to Monosky and Keeling (2020), the closure plan does not define or address any socioeconomic aspects of mine closure, nor does it mention any community engagement in closure planning. The next version of Raglan Mine's closure plan is now in development and must be submitted again to the Quebec Government in 2024, as required by the Quebec Mining Act.

The current closure plan for the Raglan Mine is 11 chapters and 266 pages. It addresses various elements of mine closure, including descriptions of current mining operations and environmental conditions, permanent and temporary closure measures, and financial estimations for closure work. The closure measures identified pertain mainly to the technical and environmental aspects of the process, rather than to the social and cultural challenges associated with mine closure. The closure plan also addresses the decommissioning plan for Raglan Mine's port at Deception Bay, which is not part of the mine site. In fact, the port has been there for many years and has been used by multiple mining companies in Nunavik. While operational, Asbestos Hill used the port for shipping asbestos and the currently operational Canadian Royalties Mine (located 32 kilometers from Raglan Mine) also uses the port infrastructure for shipping its copper and nickel products (George, 2012). Raglan Mine has its own dock used to transport products in and out of the region, including the transportation of ore from the mine, down south.

The Raglan Mine closure plan thoroughly discusses plans for tailings and waste rock management and the decommissioning of infrastructure. Although it addresses important technical and environmental issues, social and economic objectives are not articulated and community engagement is not included in the plan. In order to address community concerns and alleviate the impacts experienced by Nunavik Inuit when the Raglan Mine closes, the CPSC was established by the Raglan Committee in March 2018, as an avenue for community and company representatives to inform and improve Raglan Mine's closure strategies. The committee is

composed of representatives from Makivik Corporation, Raglan Mine, and the communities of Salluit and Kangiqsujuaq, as well as mining reclamation experts (Glencore Canada, 2021). The committee is working collaboratively to revise the existing closure plan through the use of both industry and Inuit knowledge. I was invited to attend CPSC meetings by my supervisor, Dr. Arn Keeling, who was invited to be an official member on the committee as the social mining specialist.

In accordance with the vision and mission of the CPSC, the goal of this research is to help ensure that the needs and priorities of Nunavik Inuit will be addressed in the next version of Raglan Mine's closure plan. At the first meeting in March 2018, I presented and discussed a research proposal, which was approved by the subcommittee. Subsequent meetings were held via telephone where committee members assisted in developing and refining my research plan. The main focus during this phase was on when I would travel to the communities, who I would interview, how I would recruit participants, and the questions I would ask. Interviews were conducted in June 2018, after which I presented my results in August to the committee. As a guest member on the committee, I also assisted in administrative tasks during and between CPSC meetings, including writing minutes, recording key messages, and helping to develop and document the vision and mission statements and a timeline of important deliverables identified at the March 2018 meeting.

3.3. Methods

As the purpose of this research was to gain in-depth knowledge about the values and priorities of Nunavik Inuit in relation to mine closure, interviews were chosen as the primary means of data collection for this research. Interviews are the most common and most important type of qualitative methods (Cassell & Symon, 2004; Qu & Dumay, 2011). Interviews are a

flexible method of data collection that can be very specific and focused on the research subject or more broadly defined as a way to gather general concepts and ideas (Cassell & Symon, 2004). Semi-structured interviews specifically were used, which rely on a prepared list of questions followed by prompts to generate a more detailed and elaborate response from the participant (Qu & Dumay, 2011). This strategy allows participants to direct the interview based on their own knowledge and experiences, and to respond on their own terms with no right or wrong answer, while still ensuring that the interview covers important topics relevant to the research (Qu & Dumay, 2011).

The CPSC assisted with the development of the interview question guide to ensure it was relevant and appropriate. I developed a preliminary set of interview questions, which I then sent to the CPSC for review and suggestions for improvement in order to make sure that it was appropriately designed to gather as much relevant information as possible from the study participants. Questions ranged from questions about employment (i.e. have you ever worked for Raglan Mine), closure (i.e. what are some of the concerns you have with the future closure of the mine) and communication (i.e. how do you gather information about the operations that take place at the mine site). My involvement with the committee was very beneficial, as representatives from both Salluit and Kangiqsujuaq were able to give their input based on their knowledge of their own communities.

Interview participants were selected based on their relevance to the objective of the study, using purposive sampling. Purposive sampling choses participants based on their knowledge of or experience with a specific subject (Palinkas et al., 2015; Tongco, 2007). Purposive sampling is more useful than random sampling as it looks to gather participants who are knowledgeable in the topic versus those who may or may not have insight into the subject (Palinkas et. al., 2015;

Palys, 2008). Participants were identified with guidance from the CPSC, based on their knowledge of mining and relationship to either Asbestos Hill or Raglan Mine. Most participants chosen to participate were previous or current workers at these mines. Other participants included those who showed interest in and knowledge of mining, and of the Raglan Mine operation in particular. Participants fell into one of four categories: **Category A**: Asbestos Hill worker; **Category B:** Raglan Mine worker; **Category C:** Worked at neither Asbestos Hill or Raglan Mine; **Category D:** Worked at both Asbestos Hill and Raglan Mine. There were 15 participant's in total. Those who fell into Category C had never worked for a mining company before, but were interested and had opinions on the mine's operations.

Ethics clearance was obtained from Memorial University's ICEHR prior to conducting interviews, after which I travelled to the communities in June 2018 for two weeks. Interviews were conducted first in Salluit, then in Kangiqsujuaq. In most cases, interviews were arranged ahead of time with the help of the Raglan's community liaison officers from Salluit and Kangiqsujuaq. In Salluit, however, I also knocked on the doors of several houses to recruit additional participants. Each person contacted was given a recruitment flyer describing the research and who I was. The recruitment flyer can be found in Appendix III. In total, ten interviews were undertaken in Salluit, and five in Kangiqsujuaq. Although only fifteen interviews were conducted, theoretical saturation was reached, meaning similar answers were being given by participants, producing patterns in the data, and no new material was being revealed (Nascimento et al., 2018). It is important to note that fewer interviews were conducted in Kangiqsujuaq because several deaths had taken place in the community prior to and during my stay, and many families were grieving during that time.

Interviews were recorded using an iPhone and then later transferred to a laptop and transcribed using software called Inqscribe. Once all interviews were transcribed, they were reviewed to identify and differentiate themes contained in the data (O'Connor & Gibson, 2003). Preliminary results revealed six major themes, which were consolidated into four categories. The initial themes were: buildings and equipment; roads, docks and airstrips; communication; concerns; involvement; and ideas. These then were organized into the themes of: infrastructure, environment, employment impacts, and company-community relations. The results are organized below into these four categories and related to the relevant information in Raglan Mine's current closure plan.

3.4. Results

The results indicated that, in general, community members do not want buildings to be left abandoned as they were at Asbestos Hill. Instead, they preferred to repurpose the different buildings (i.e. accommodation facility, mining complex) or materials. Environmental protection was an extremely important topic. Participants voiced their concern for migratory animals and aquatic species as the environment will again be transformed potentially impacting these species. Employment was also an important topic. When the mine ceases operations Inuit want to be involved in the closure process whether it be through monitoring and maintenance, or other duties which should take place in perpetuity. Finally, community engagement was a strong priority. Participants indicated that Raglan Mine's communication is better than that of Canadian Royalties (which also has an IBA with the Inuit communities), but there is still room for improvement.

3.4.1. Infrastructure

Infrastructure emerged as one of the most common topics discussed in the interviews. The former Asbestos Hill Mine had abandoned many of its buildings, as well as much of its mining equipment and debris, creating a negative impact on the communities of Salluit and Kangiqsujuaq (Carney, 2016). No remediation or monitoring of the environment and wildlife took place, generating concerns for different species in the area and adjacent communities (Carney, 2016). Few policies were in place to manage the reclamation and restoration of a mine site at the time of closure. Although Asbestos Hill was abandoned in the 1980s, it is still undergoing restoration processes to date. As a result of Asbestos Hill doing poorly in this regard, community members are preoccupied with what Raglan Mine is going to do with its infrastructure after closure.

Section 12.8 of the Raglan Agreement discusses the right of first refusal regarding surplus equipment and property, which "gives Inuit Parties a right of first refusal prior to the removal or demolition of facilities that Raglan considers to be surplus to requirements" (SNC-Lavalin & Raglan Mine, 2016). In other words, Inuit parties are given the option to obtain or purchase any assets after closure. As one participant stated, "We have to make sure that we keep what can be kept that could benefit Inuit in this region and communities" (Interview S4). Raglan Mine has agreed that before assets are offered, they will be assessed to determine whether they conform to health and safety standards, their remaining useful life, and the presence of dangerous material. This will ensure that the buildings will remain useful to the Inuit parties. Not only that, but provision 12.8 of the Raglan Agreement states that the future status of Raglan mine roads and facilities must be negotiated with relevant provincial and regional agencies (SNC-Lavalin & Raglan Mine, 2016). However, a fundamental assumption of the current closure plan is that all

infrastructure will be dismantled and removed from the premises, with the underlying soils characterized and subsequently managed. The closure plan contains no concrete strategies for executing the right of first refusal.

The current closure plan divides infrastructure into three categories: electrical, transportation, and support infrastructure. The electrical infrastructure includes power plants, generators, and two wind turbines. The transportation infrastructure consists of the roads allowing for the transportation of minerals and employees from different areas on the mine site and Deception Bay. Lastly, there are 98 different support infrastructures on site, including those at the Donaldson Zone (the airstrip) and Deception Bay port. Section 4.4.1 of the closure plan states "for this reclamation plan, all infrastructures and buildings, including those at Deception Bay, Katinniq and Donaldson will be dismantled and included in the Raglan Mine dismantling schedule. After demolition, materials will be sent south, buried or burned" (p. 58).

Electricity at the Raglan Mine site is generated by diesel power plants, two wind turbines, and multiple generators. Two interview participants mentioned the wind turbines regarding the electrical infrastructure that Raglan Mine has established. One participant asked, "why not build hundreds of turbines up there?" (Interview S8), while a second participant inquired about the potential future usefulness of the turbines when they said "what about the wind turbine? Can that windmill store energy and the energy be brought down to some other places [in Nunavik]?" (Interview S5). From these comments, it is clear that community members want to retain the electrical infrastructure, hoping it could be managed and used in new developments. According to Hydro Quebec (2019), the Inuit communities of Nunavik are reliant on diesel, which is an expensive, insecure, and polluting form of energy. If they could maintain the turbine and power plants, they would have a more reliable and financially feasible form of energy to supply to their

communities, and could also continue to maintain the Raglan Mine site. However, in order for the turbines to be useful to the communities, the wind turbine itself or the energy generated would have to be transported to the communities. This would help satisfy the electrical infrastructure needs of Nunavik as there is no electrical grid that connects Nunavik to the south (Rodon & Schott, 2014).

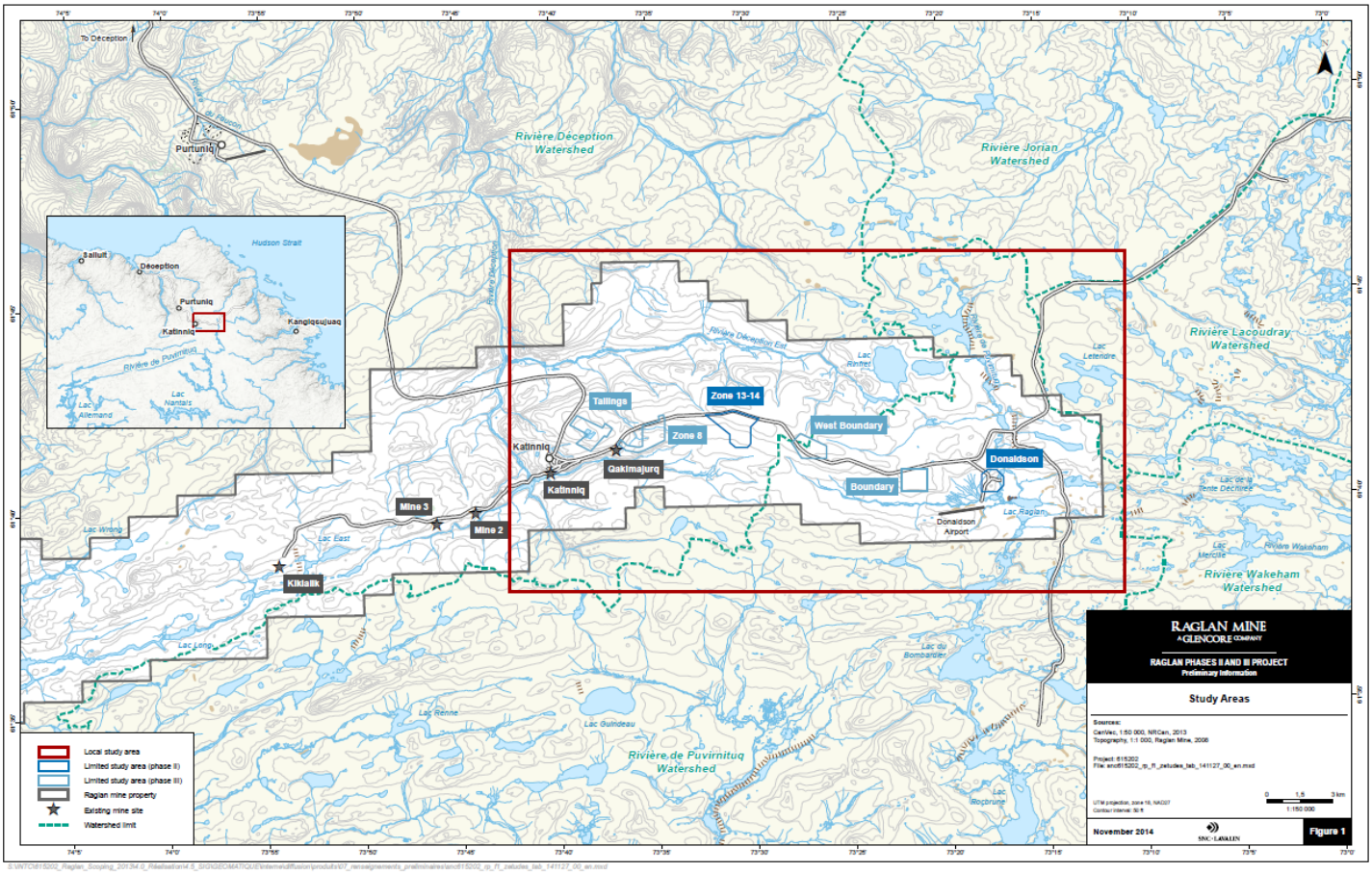

Figure 3.1 Map of the Raglan Mine site. Map provided by Raglan Mine.

Raglan Mine has established a transportation network over the course of its development, which consists of three main roads that are kept open year-round. These roads, shown in Figure 3.1 above, are: Katinniq (the Raglan Mine site) to Donaldson Airport, Katinniq to Deception Bay, and Katinniq to East Lake, through zones 2 and 3. It is the Ministry of Transportation ("MTQ") and MERN's responsibility to carry out building, rebuilding, and maintenance work on

these roads as it falls under their jurisdiction (Government of Quebec, 2020). A road that was originally built for the Asbestos Hill mine is now used as a Raglan Mine haul road. This road connects the Purtuniq (Asbestos Hill) mine site to the port at Deception Bay and is part of the provincial road system. In addition to the aforementioned roads, there is also an extensive network of shorter roads to get to and from different infrastructures on site. These roads, referred to as access roads, belong to and are maintained by Raglan Mine.

There are two airstrips located at the Donaldson Zone and Deception Bay. The Donaldson Zone airstrip is the primary landing runway at which employees get dropped off to be transported to and from the mine. The airstrip at Deception Bay is used for smaller aircraft (i.e. Dash 8), and is connected to the mine access road. There is also a port facility at Deception Bay. This port is used to import materials, equipment, machinery, fuel, and other necessary items. There is also a temporary storage facility for concentrates awaiting shipment down south.

The closure plan states that the access roads will be eliminated and the land restored through the removal of culverts and bridges, the leveling of soil to prevent erosion, and the stabilization of ditches. As a result, according to the closure plan, "the site's natural flow will be restored and the site will be restored to a state that is compatible with its environment" (SNC-Lavalin & Raglan Mine, 2018, p. 59). The plan states that both airstrips will be left as they are, with buildings dismantled. The wharf at Deception Bay is owned by the federal government and will remain under federal jurisdiction following closure. Subsequently, the airstrip at Deception Bay and the adjacent access roads will be left "as is." As it is written in the closure plan, it is unclear if the wharf and airstrip will be maintained after the closure of the mine.

The aforementioned reclamation plans differ from what interview participants envision for Raglan's infrastructure. Several participants mentioned the need to maintain the roadways,

airstrips and docks for the communities' use in the future. As one interviewee stated, "And the existing roads now, don't destroy them. Inuit could use them. Leave the airport and docks there" (Interview K5). The following quote also reinforces the need to maintain the transportation infrastructure in order for community members to safely participate in their land-based activities, "Hand over an agreement of the usage of the roads, make sure that these are and will be useable to be safe and maintained, for the communities to be able to use them for something else such as the parks, and the road is very close to the park, and of course there's hunting and fishing component to that, too" (Interview S9). By maintaining the integrity of the roads, the Inuit will have continuous access to their cabins where they depart from to participate in their traditional activities. Participation in traditional activities is a way of life for many Inuit, making it vital to keep transportation infrastructure intact. Another participant stated that the roads be maintained for the purpose of hunting and fishing, strengthening this need "Well the roads are really helpful for us to hunt and fish, so maintain the roads would be at least to kilometer 40. I think that would be a good thing for us if the roads are maintained" (Interview S5).

If there are current roads that need to be upgraded, interviewees suggested that the upgrades be completed before closure. Many participants also requested the construction of new bridges or roads. More specifically, there was discussion of installing a bridge at kilometer 10 (refer to Figure 3.1) of the Katinniq-Deception Bay road, and of building a road across kilometer 25 (refer to Figure 3.1), as this is a very popular area for community members to build their cabins. This is confirmed by the following statement:

> "I wonder if they can make a small little road towards, not far, maybe 200 feet maybe from the road, make a small path or a small road off the road at kilometer 25...Well people have been talking about the bridge at kilometer 10, but I don't know if it can come in the future...They've been talking about the bridge for a

> while but they kind of stopped talking about it. But if they get the bridge before the mine close maybe maintain it as well" (Interview S5)

Maintaining the transportation infrastructure allows for continuous access to the land where many Inuit participate in their traditional activities. "From kilometer 1 up to kilometer 30 we use, myself. I use the whole road to hunt caribou geese, and go fishing on both lakes. At kilometer 25 and kilometer 5 or 10. We go there, I just came from there yesterday" (Interview S8). Subsequently, by retaining some of these areas, it has the potential to counter the sense of isolation as the area becomes more inviting and attractive for Inuit to undertake in different land based activities. One participant stated: "Kilometer 25 and I'm building one [cabin] for my sister as well. At kilometer 25. And we go there quite regularly. We go fishing, hunting, caribou and geese hunting, and these things. There are caribou and in Deception Bay area there are seals and walrus, and whales" (Interview S2). As one interviewee summarized, the mining road network could remain as vital infrastructure connecting communities in the region:

> When the closure will be done, that they will build roads to each community and that way we can have a heart of Nunavik. That even though that the garage is closed, we can make roads because we have expensive food coming by airplane but with the road were going to have a future...the road will be built and will help a lot of people and open Nunavik and help to get to campsites, and use trails and rail road, it will be more useful, even if its close, that the equipment and all the assets will be useful (Interview K3).

Community members from Salluit also want the Northern Village to gain ownership of the wharf at Deception Bay: "My request to Glencore is to maintain it when it's closed at least once a month or every few months. Often maintain the roads so they are safe to use, and also request that [when] the mine is closed, the big building - the dome - be given to Salluit and also the dock" (Interview S8). Similar to the roads, community members Inuit want to keep the

building infrastructure and repurpose them to become useful to Inuit in other ways. For example, it was suggested that the dome at Deception Bay could can be repurposed to be a community shelter and garage. Many Inuit use their ATV's and snowmobiles to access Deception Bay where the garage can be used as a shelter to stay in if they break down and need to fix their recreational vehicle. The following is an excerpt from an interview supporting the need to maintain infrastructure at Deception Bay:

> I think it would be nice to have the Honco to be put to Deception Bay. I think it would be very valuable for Salluit because every year the total amount of people that go fishing there I'd say 800, for one spring because one person you can count that person multiple times in one year. But especially in the spring you get like let's say even up to 100 people going up to the infamous 2 lakes near Deception Bay. There's a lot of people that go fishing over there and it'd be nice to have the Honco in that area because it would help us in that area, because we run into problems in that area – snowmobiles break down. Honco is the garage (Interview S6).

In addition to the electrical and transportation infrastructure, there are many buildings and assets that are classified as support infrastructure. At the Katinniq site there are accommodation facilities, petroleum tanks, a water treatment plant, and power station. Support infrastructure is important to all of Nunavik, not just Salluit and Kangiqsujuaq. Many communities lack infrastructure such as buildings and roads, which is part of why they would like to obtain such assets when the mine closes. Rural and northern communities present unique infrastructure needs for several reasons: costs are high due to remoteness; extra materials are needed to construct infrastructure that can withstand permafrost and extreme cold conditions; materials need to be transported from southern areas; and many times, outside companies need to be hired to construct infrastructure as communities to not have the tools and skills sets to do so themselves (Rodon & Schott, 2014; Mills & Sweeny, 2013).

Interview respondents expressed great interest in making use of the support infrastructures left behind after mine closure, if possible. No community members want to see the buildings decaying and being vandalized; as one participant stated: “Do not leave them up there, do not abandon them. Bring all the assets to Wakeham Bay [Kangiqsujuaq] and maybe even the camp sites can benefit from those – be very useful for the communities – for the camps and for the hunters” (Interview K4). Interview participants suggested that any buildings which could not be used be dismantled and relocated to the communities, not simply be shipped south as per the current closure plan. If a building has useful parts to it, but the structure itself is no longer intact, items such as windows and doors could be removed and used to build cabins for community members. One interview participant recalled that he had repurposed windows from the Raglan Mine which he was given to use for his cabin: “Currently just finishing my cabin at kilometer 10. I started it a few years ago and I am just finishing it now. The windows are from the mine as well that they gave away a few years ago. It was really nice to get the windows for my cabin” (Interview S5). Participants proposed turning the large accommodations and mining complex into something useful, such as emergency cabins for when the weather gets bad, a giant hospital for all of Nunavik, a detention facility, or a research centre.

Overall, interview results identified that Inuit would like to repurpose the infrastructure to support key community needs in the future. Infrastructure could be used to support Inuit participation in travel and land-based activities. Buildings could be used to establish community facilities such as a hospital or detention centre in Nunavik, and building materials can be given to individuals for their own use. Electrical infrastructure can be maintained to help Inuit establish as a more reliable form of hydro. Subsequently, transportation infrastructure can be managed and

maintained so Inuit can continue to safely get to their destination and improve access to hunting and fishing areas.

3.4.2. Environmental Impacts

Environmental impacts were the participants' greatest concern. For Inuit, it is vital that the health of the environment, and particularly that of fish and migratory species such as caribou, be maintained. Section 4.2 of the closure report, titled Background and Environmental Issues, outlines four areas of environmental concern identified by the Raglan Mine. These include the land and waterways affected by infrastructure developments; the soils and other environmental components that may have been contaminated during construction and operations; the tailings storage facility (TSF) where all the contaminated material is stored; and, finally, the waste rock piles and ore storage areas. In order to address soil contamination, a rehabilitation plan is to be developed in accordance with the Policy on the Protection and Rehabilitation of Contaminated Lands and the section 31.51 of the Environmental Quality Act ("EQA"). Importantly, however, this plan will be developed only if the level of contamination exceeds the permitted limit in the areas where samples will be taken within six months of closure. Section 5.2 of Raglan's closure plan, Environmental Monitoring, indicates that the main focus will be on surface water monitoring for 10 years following closure. Groundwater contamination will not be considered due to the presence of permafrost.

The mining industry produces large volumes of waste (Kossof et al., 2014). There are two types of waste produced during mining: tailings and waste rock. Waste rock is solid waste produced once the rock is stripped or excavated to access the ore (Lu & Cai, 2012). Tailings make up the largest waste stream produced by mining (Kossof et. al., 2014; Schoenberger, 2016). Tailings are produced from mineral beneficiation, which is the physical process used to

separate the minerals from the rock (Lu & Cai, 2012). After processing, the leftover material that is too low-grade for economic recovery becomes waste. The mixture of rock and processing fluids creates tailings, which, when oxidized, can produce major contaminant metals and metalloids (Kossof et al., 2014). Once produced, the tailings are stored in a tailings storage facility ("TSF"), which can occupy several square kilometers of land (Schoenberger, 2016). When stored improperly, tailings can have severe environmental, human health, and economic impacts (Kossof et al., 2014). At Raglan Mine, both waste rock and tailings contain potentially acid-generating materials. In other words, when waste rock or tailings are exposed to oxygen and water, they produce acid runoff, which can contaminate the environment and affect human health (Ministry of Energy and Mines and Ministry of Environment, Land and Parks, 1998).

Raglan Mine produces about 1.1Mt (Mt = megaton) of tailings annually (SNC-Lavalin & Raglan Mine, 2018). Raglan Mine uses dry stack tailings (also referred to as filtered tailings), meaning they use a process of dewatering the tailings until they are unsaturated to create a stable deposit of the contaminated materials (Engels, 2021). The tailings are filtered into a sandy silt and stored in the TSF. More conventional methods require the saturated materials to be transported through pipelines for disposal; however, "dry" tailings are transported by conveyor or truck, decreasing the potential for groundwater contamination and preventing pipes from undergoing freezing and frost problems (Engels, 2021). As of December 2017, the tailings area at Raglan Mine occupied 65.4 hectares of land. That area is expected to increase to 98 hectares at the time of closure, which is the same as approximately 98 rugby fields (one rugby field = 1.008 hectares), to a height of about 40 metres (SNC-Lavalin & Raglan Mine, 2018). The Raglan Mine closure plan outlines different options for covering and securing the tailings following closure. These: (1) geomembrane cover; (2) rockfill thermal cover; (3) capillary barrier with

desulphurized tailings; and (4) desulphurized tailings thermal cover. After researching all these options, the geomembrane option was ultimately chosen. This is a multilayered cover intended to prevent the infiltration of water and oxygen into the tailings and to manage surface runoff from the TSF.

The closure plan states that permafrost conditions will keep the tailings frozen, helping prevent acid generation or leaching. Although permafrost is currently present at the mine site, climate change may affect the presence and stability of permafrost in the future as it degrades under a warming planet, a factor taken into account by the closure plan (Pearce et al., 2011). The plan assessed various tailing cover thicknesses to accommodate for the active layer of permafrost (the layer that changes from being in a frozen state to a thawed state each year), and evaluated the best cover performance over a period of 100 years (SNC-Lavalin & Raglan Mine, 2018). The closure plan concludes that warming conditions, as extreme as they are predicted to be, will have no impact and once covered, the tailings will remain frozen. This has been demonstrated using specific models and assumptions based on warming trends predicted by the Intergovernmental Panel on Climate Change (SNC-Lavalin & Raglan Mine, 2018). However, climate change is extremely difficult to model further into the future and the climate predictions used are for Canada only and do not account for seasonal or regional variation (SNC-Lavalin & Raglan Mine, 2018).

Despite the high stakes of tailings remediation, storage and management, the topic was not as commonly discussed in interviews compared to the discussions of infrastructure. This may be due to participants' lack of knowledge about tailings. Throughout the interviews, participants were asked a variety of questions which related indirectly to tailings, such as question 7: "In 2041, when Raglan closes the mine, how would you, as a person from Salluit or Kangiqsujuaq,

want the reclamation process to proceed? What should it entail and when should it be started? This question was followed by a list of different tailings-related issues to address in the closure plan (Refer to Appendix I). Notably, however, only three participants mentioned tailings. One referred to the tailings at Asbestos Hill and another stated that the mine should "send the tailings down south" (Interview K4). The third respondent noted that "[the tailings] might be poison and I want that to be taken care of before you leave" (Interview S3).

While interview participants did not express many opinions about tailings, they did indicate many concerns about the environment broadly. They wanted to know that the environment will be protected and that animals will be safe. One interviewee commented, "The other thing that we want to ensure is that there is as little as possible the damage to the land and water, environment is everybody's concern" (Interview S4). Many noted that the closure process itself was likely to affect the community, the environment, and valued species. Just as the environment was altered during construction of the mine, it will again be altered by the deconstruction of infrastructure.

Many participants expressed their concerns for the environment, as it is something that they depend on for their livelihoods. One participant commented: "The land itself is most important to protect—the land, the water, the lakes, the fish and the animals that are staying over there. There are three big lakes over there and all of them are very important for the community. Everybody hunts on those three lakes and [in] Deception Bay" (Interview S7). The environment allows Inuit to participate in traditional activities that can relate to their health and quality of life. If the integrity of the environment becomes compromised, it also compromises the livelihoods of the Inuit. The following quote expresses the individual's concern for the health of migratory species:

> Well, we're [my cabin] very close to the mining and very close to our fishing spot and I know that it's route for the migration of land mammals and if it were too close how would it affect the migration of the sea mammals? I think it would also impact the movement of the marine transportation. (Interview S6).

As these quotes illustrate, many community members use the environment for land-based activities and for harvesting. In fact, these activities are a way of life for many Inuit as it provides an income for some families, and a means of food for others. Therefore, general concerns for the environment were present. However, respondents did not identify specific concerns, perhaps due to the lack of knowledge and understanding regarding tailings and waste rock reclamation in the closure plan.

3.4.3. Employment Impacts

The third theme emerging from interviews was the employment impacts of closure. As explained in Chapter 2, there are four main areas of impact that need to be addressed when developing a social closure plan. These areas are employment, municipal and social services, community cohesiveness, and the environment. Environmental aspects of mine closure tend to receive the majority of attention in closure plans, including Raglan's, while social and economic components are routinely neglected (Monosky & Keeling, 2020). There are challenges in addressing these impacts and, due to the remoteness of the region, some communities may not recover economically once the mine closes down (Rheaume & Caron-Vuotari, 2013). Furthermore, while Quebec's Mine Closure Guidelines recommend that social impacts be included, little guidance is given on how to do it (Monosky & Keeling, 2021; Quebec MERN, 2021). Despite that recommendation, however, Raglan Mine's current closure plan still lacks any detailed consideration or planning for the social and economic aspects of closure.

Employment is one of the most direct impacts of closure, as many Inuit are dependent on the mine for an income and a higher quality of life. Despite that fact that the majority of employment in Nunavik is in the public sector (60% of working individuals in Nunavik have full time jobs in the public sector) mining employs the most Inuit in the private sector (36% of working individuals in Nunavik have full times jobs in the private sector) (Makivik Corporation, 1999; Rodon & Schott, 2014). Air transportation, small businesses, and construction jobs make up the rest of the private sector employment opportunities (Makivik Corporation, 1999). However, the construction sector has not been able to rebuild itself after a significant decline in 1991 (Rodon & Schott, 2014). Currently, the Raglan Mine employs over 600 workers, about 16 percent of whom are Inuit (Government of Canada, 2018). When Raglan Mine opened they had and continue to have an obligation for a workforce that is 20% Inuit, at minimum (Rodon & Levesque, 2015). As a result, various employment training programs were developed to help meet this goal (Rodon & Leveqsue, 2015). With this priority to increase Inuit employment at the mine, it makes it even more important to ensure that the closure plan that takes into account post-closure employment.

The examples of Rankin Inlet and Nanisivik reviewed in the previous chapter illustrate the importance of considering employment loss in closure planning. The rapid and unplanned closure at these mines affected each community's economic sustainability, and resulted in job loss caused outmigration as many Inuit moved to find work in other regions. Therefore, it is important for closure planning to address the situation of current employees who will lose their jobs once the mine closes down. In addition, when the mine shuts down, not only will jobs be lost but profit sharing between the mine and communities will also end.

Provision 5.7 of the Raglan Agreement states that the "mine should work to find suitable alternative employment for beneficiary employees" post closure (SNC-Lavalin & Raglan Mine, 2016). Although the mine employs many Nunavimmiut, few interview participants mentioned that employment and money would be a concern for them after the mine closes. This revealed that few people have thought about the post-mining economy. The issue primarily arose when I brought it up after no other concerns about closure were mentioned. It is worth noting as well that the money which Inuit make at the mine is greater than what they would make at jobs in their communities. Employment therefore needs to be considered carefully, as it can have major impacts on people's livelihoods and quality of life. One participant mentioned that it would be a good idea for the Raglan Mine to put money aside for Inuit employees to help support them after the mine closes down. This would allow for communities, individuals and families time to adjust to the changes in their quality of life after closure (Interview S1).

In addition, the beneficiary communities are used to getting extra funds under the Raglan Agreement, but these funds will inevitably end once operations cease (Rodon and Levesque, 2013). The communities of Salluit and Kangiqsujuaq receive profit shares from the company, what are distributed to individuals (in some cases) or used for community projects. Specifically, the participant stated that "when it comes to us to get money from Raglan, our compensation whatever, the profit sharing whatever why do they [Raglan] buy all this stuff material, trucks, with our profit sharing. This is what's left, and now we share it...They [Raglan] help a lot, they do a lot for our community, they go over a lot, not going to lie about that, I'm proud of what they do, I like what they do. They try their best but sometimes it's just not enough" (Interview S1). This reiterates the fact that participants believe that their communities are not receiving money in

amounts that they should be. Whatever the case, the fact remainsthat profit sharing will cease once the mine closes and money will no longer be given to either community.

Many participants stated that they would like to be involved in the cleanup of Raglan, which would also provide potential economic opportunities. Both community members and workers should and want to be involved in this process. Provision 12.6 of the Raglan Agreement states that the "restoration and reclamation work should be planned with the participation of members of the Raglan Committee" which has, as mentioned, developed the CPSC. One participant asserted, "We have to be involved; we need to be involved" (Interview S2). Inuit want to be directly and physically involved in the closure and remediation process. Community members want to participate in the actual closure and cleanup of the site to ensure that their concerns are addressed adequately. This reaffirms that Inuit want to be employed at Raglan, even during the closure process.

As part of closure planning, the company has a continuing responsibility to address the socio-economic effects of eventual closure. Bowes-Lyon (2006), and Rixen and Blangy (2016) discuss how those previously employed by mines find it difficult to adjust to their new standard of living, with many Inuit having to resort to social assistance. To alleviate such challenges, the planning process for the entire life cycle of the mine, including closure, needs to take into account community wishes and concerns. Improved mitigation of potential closure impacts occur only when planning takes place. Therefore, a healthy relationship between the companies and communities is required, where communities are included in the decision making process (Bowes-Lyon, 2006).

3.4.4. Company-Community Relations

As discussed in Chapter 2, community engagement and communication are important aspects of closure as they contribute to holistic closure plans. The Nanisivik case, for instance, illustrated the need for clear communication and ongoing engagement with communities impacted by mining in order for successful mine closure to occur (Costa, 2015; Monosky, 2020). Without community engagement, the mining company fails to address all the impacts that closure may have. By contrast, when the mining company engages with the impacted communities, it allows their concerns and visions to be heard, and the company can learn how to support their transition to a post-mining economy (Costa, 2015). This reinforces the importance of a healthy relationship between the company and community(s) based on transparency, respect, good ethics and responsibility (Bowes-Lyhon, 2006; Costa, 2015).

Although the mine is not projected to close until 2041, Raglan Mine holds frequent consultations related to mine closure, in addition to all other phases of the mine's life. In order to strengthen its relationship with the communities of Salluit and Kangiqsujuaq, Raglan Mine established a Community Mining Liaison Officer position in each community in 2018. Each position has been filled by a local Inuk whose job is to act as an intermediary between the Raglan Mine and the communities. Community members can bring their questions and concerns to the community liaisons and be directed to additional information. Raglan Mine also hosts annual environmental forums in the communities. These forums are organized, in part, to provide the mine with an opportunity to present to the community members the environmental research that is taking place in the region on topics such as ice thickness, caribou, and arctic char. Mining representatives give different presentations, such as Mining 101, which provides information to community members about the mining lifecycle. This presentation is usually given twice—once

to students from the school, and again to community members in the evening. Presentations are also given about tailings management and other environmental initiatives. Researchers and mine representatives will also go on the radio to answer questions that people have about the operations at the mine.

The interviews for this study enabled participants to reflect on their respective communities' relationships with the mine and how improvements to engagement and communication with Nunavik Inuit could be made. Some participants suggested more could be done to communicate with communities. One participant stated "Raglan could improve their communication - always room for improvement. Everyone has to be open minded, has to be transparent" (Interview S10).

Although Raglan Mine has established the aforementioned channels for communication, some participants expressed that Raglan Mine could improve their efforts in sharing updates with the communities. Another participant stated that the mine needs to communicate with the communities more often, holding monthly events rather than annual ones, to provide a continuous flow of information. Another stated that they "want[ed] to be informed ahead of time" about new activities that will be taking place at the mine such as the development of a new mine site (Interview K1). They felt that if, for example, another mine was going to be constructed by Raglan, the implications and related community concerns should be addressed beforehand instead of during or after development. Some interviewees stated when the mine does travel to the communities, it should spend its time listening to what people have to say, as some community members feel ignored. This was strongly expressed in the following statement:

> "They try their best but sometimes it's just not enough. Like I said, when they come, they should spend time hearing what people have to say…it's only going to change when they start listening to what we really need to say, not what

> they always want to say or how they have to make things go. They [the Raglan Mine] come in say[ing] we're going to have a meeting with the people and come in with their agendas, and then [when] the people start to open to respond, they start to leave. Why do they waste our time just to listen to you [Raglan Mine] all the time? They only care [about] what they want to hear, when they want to hear…And when we do, they always think of something to screw up our way we're thinking, they try to take us off course" (Interview S1).

The communication, according to this statement, seems to be based on the company's agenda and less so on the needs and priorities of the communities. Despite Raglan having many communication channels, some community members feel that it is not a two-way channel. Some Inuit feel like they are not being heard and that Raglan Mine is not taking into consideration what the communities have to say.

On a more positive note, most participants were happy that the mine is making an effort to consult with the communities about these issues. In fact, one participant went so far as to say that Canadian Royalties, another mine located in Nunavik, needs to follow Raglan's example in regards to their communication. (Canadian Royalties, 2021). Canadian Royalties, which operates the Nunavik Nickel mine, also has an IBA signed with the aforementioned communities (Canadian Royalties, 2021). Nevertheless, many participants commented on how poorly Canadian Royalties communicates and engages with them, and noted that the company should follow the lead of Raglan Mine. Participants reflected upon how grateful they were that Raglan Mine is as transparent as it is. Despite some criticism from community members, interview participants did note that Raglan's community engagement strategy was better than that of Canadian Royalties.

3.5. Discussion

Infrastructure, the environment, employment impacts, and company-community relations were the four themes that emerged from the interviews as priorities for mine closure planning.

Participants want to keep mine infrastructure to repurpose into new facilities or take the usable parts for other buildings. They also voiced their desire to maintain all transportation infrastructure. The environment was a general concern for community members. Although the closure plan adequately addresses tailings and waste rock, these issues were not frequently raised by participants, perhaps due to lack of knowledge or understanding. In regards to employment impacts, interviews revealed that participants do not have a vision for a post-mining economy. Therefore, the concept of closure needs to be discussed with the communities of Salluit and Kangiqsujuaq. In terms of company-community relations, participants stated that Raglan's communication is better than most industrial companies but there is still room for improvement. Communities stated that want to be continuously engaged with for future mining decisions and actively involved in the closure process. Overall, it is important that the concerns and recommendations of the Inuit of Salluit and Kangiqsujuaq outlined in this chapter be considered. Fortunately, the mine is not slated to close until 2041, allowing ample time for adjustments to be made to include a social component.

The environment was one of the main concerns revealed in the interviews, as the health and stability of the environment is critical for Inuit food systems and cultural well-being (Kwaitkowski et al., 2009; Tester & Irniq, 2008). However, mine remediation can actually cause environmental contamination as it requires the movement of potentially hazardous and dangerous materials (Sandlos & Keeling, 2013). Additionally, the change in placement of infrastructure alters the environment from what animals have come to know over the last 25 years or so as a result of the original mining operations. This may impact migratory animals, as well as fish and other organisms living in the lakes and rivers, as there will be changes to the water system. For example, according to the closure plan, natural flow will be restored to many

aquatic environments through the removal of the bridges, culverts, and roads potentially impacting aquatic species. The closure plan does not mention any mitigation efforts that will be made to limit impacts to migratory animals such as caribou due to the removal of infrastructure. It is important to note that the remediation of mines actually does not convert the land to its previous state, rather it is converted to a future land use (Lottermoser, 2007). Unfortunately, efforts made to remediate the land may not be enough to certify that closure will protect the environment in the long-term (Hudson-Edwards, Jameison, & Lottermoser, 2011).

Despite the gaps in planning for some migratory animals, the closure plan does deal substantially with the environmental aspects of closure. The closure plan states four environmental areas of concern that are to be addressed: land and waterways, soil, tailings, and waste rock. Although tailings were rarely mentioned, when it was, it became a big concern however community members ability to participate in planning for tailings and remediation is hindered by the lack of detailed knowledge about mine tailings. At Asbestos Hill, the tailings were not remediated causing distrust and uncertainty with environmental quality after closure had occurred (Carney, 2016). This has made environmental contamination a key concern for Raglan Mine and Nunavik communities, as they want to avoid re-creating issues of contamination and distrust in Nunavik.

However, this preoccupation with the environmental aspects of closure has meant that other aspects of closure, like planning for social and economic impacts, are neglected in closure planning. As the Raglan Agreement has promised the right of first refusal to the Inuit of Salluit and Kangiqsujuaq, it states that Inuit parties have the option “to purchase prior to its removal or demolition, any equipment or property related to construction or operation of the Raglan Project” (“Raglan Agreement”, 1995, p. 114). The right of first refusal therefore allows Nunavik

communities to acquire infrastructure that has been developed for the mine, for themselves and their communities. Gaining the right to several pieces of infrastructure would be of great benefit to the Inuit communities. As noted in Chapter 2 during the discussion of the Nanisivik Mine, Arctic Bay wanted the infrastructure for their community due to infrastructure shortages that existed. However, it was all demolished, a choice which was extremely wasteful. Similarly, infrastructures at the Asbestos Hill mine site were left intact and merely abandoned, creating negative memories for the nearby communities (Carney, 2016).

Interview participants expressed a desire to keep the existing mine infrastructure, including the wind turbines. The two wind turbines now in operation have allowed the mine to save 7.5 million liters of diesel and significantly reduce greenhouse gas emissions (by 21 kilotons) since 2014 (Glencore Canada, 2018). Nunavik communities currently rely on diesel fuel, and if they are able to take over the ownership of the turbines it would be a great asset to their communities. Having ownership of the turbines would produce jobs related to their operation and maintenance, and provide a clean form of energy for community use. However, for the wind turbines to be useful post-closure, they need to be transported to the communities, which poses a challenge. There is no electrical grid that connects Raglan Mine to Nunavik, or Nunavik to southern Quebec (Rodon & Schott, 2014). Raglan Mine could potentially invest in a renewable energy system that the Inuit can access for their own use, and for training for monitoring and maintenance of the hydro system. This would supply necessary hydro to Raglan, and Nunavik communities while allowing Inuit to gain valuable skill sets (Rodon & Schott, 2014).

Nunavik communities are remote, which presents several challenges for new development, and as mine infrastructures are already there, it would be inappropriate to demolish

them if they can be useful. The current closure plan does not present any concrete plans for how the transfer of ownership will work or what it applies to, it only states that "[the right of first refusal] will be fully adopted prior to the demobilization of any installed infrastructure" (SNC-Lavalin & Raglan Mine, 2018, p.55). This leaves a lot of uncertainty as there is no discussion of what will happen to the road system, wind turbines, or buildings structures if communities wish to adopt them. Therefore, adequate closure planning can ensure that the potential reuse and maintenance of infrastructure for the communities can be an important benefit, reflecting Inuit values and priorities.

The impacts to employment and community financial well-being must be addressed, as they are the main component of a social closure plan. As detailed in Chapter 2, the closure of Rankin Inlet caused outmigration, but many Inuit were unsuccessful in securing work elsewhere. As a result, they became reliant on welfare and government assistance because closure plans were haphazard and incomplete, and inconsiderate of their previous dependence on the mine for an income and improved quality of life (Cater & Keeling, 2013). Issues of unemployment remain pressing in the Arctic. This is because Arctic communities are very remote, making them more vulnerable to economic changes as the mine is a main source of economic wealth for the community at hand (Haney and Shkaratan, 2003). Due to the community's remoteness, it is also more difficult to find employment without having to travel long distances as many did after the closure of Rankin Inlet (Keeling & Boulter, 2015). Most often this will include rotational work schedules (i.e. two weeks on, two weeks off), separating workers from their families. Profit-sharing for the entire community will also stop as a result of closure meaning the entire community will suffer economic losses in addition to the loss of wages experienced by previous

employees. This makes the question of economic impacts ever more pressing (Rodon & Schott, 2014).

Environmental rehabilitation is mentioned throughout the closure plan, but there is no mention of the mitigation of negative socio-economic impacts. Nor is socio-economic closure planning required by the Quebec mine closure guidelines (Monosky & Keeling, 2020). Skills developed by employees during mining operations may not be easily transferable to other careers. There are a limited number of mines in Nunavik and the distance that has to be travelled to work will most likely increase or relocation will be required if another job was found at a mine outside the region. Involving Inuit in the remediation work of Raglan Mine will allow them to continue working once the mine closes, but also helps them to develop new skills. Although Raglan is working to educate, train and employ Inuit through programs like Tamatumani, this effort could be extended to involve Inuit in the closure process and subsequent monitoring practices. In addition to gaining new skills, employment in the closure and remediation process would allow for Inuit to be informed about and directly involved in the cleanup of the environment.

Finally, in regards to community consultation, engagement, and communication between Raglan Mine and Nunavik Inuit, Raglan has established community liaison officers, the Raglan Committee, and the CPSC, and regularly hosts environmental forums as ways of communicating information to and consulting with Salluit and Kangiqsujuaq. This needs to continue in order for a successful closure plan to result. As mentioned, there is always room for improvement, Raglan Mine can begin to advance their communication and engagement by discussing closure with community members. The topic of closure was one that participants didn't seem to have detailed knowledge about, and so communicating the realities of mine closure to the communities is of

utmost importance if they are to participate in closure planning. Furthermore, closure planning for the loss of employment and business opportunities is a process that could involve the mine, communities and the regional and provincial governments.

Clear communication is also vital. Language barriers create challenges, as do cultural differences, which can lead to problems similar to the ones that resulted in the Nanisivik case. Because of these differences and the strong connection that Inuit have to land and land-based livelihoods, communities need to be full participants in the mining process - including closure (Brown, 2020). For instance, the relative lack of engagement by interview participants with the topic of mine tailings does not necessarily suggest that it is not an important issue, but rather that they are not well grounded in what tailings are and how they are managed. The issue needs to be better communicated to the communities so they have a better understanding of its importance, and are better able to contribute to planning and decision making with regards to mine tailings. The high stakes associated with tailings management means that mining communities need to have an honest and complete understanding of these issues (Caldwell, Oboni, & Oboni, 2015).

3.6. Conclusion

Mining economies create ‘boom and bust’ cycles, where the closure of a mine can leave few economic alternatives for small and remote communities, which affect the well-being of many community members (Buell, 2006). As mining has the ability to improve economic development in communities, contributing to businesses, education, and infrastructure, it becomes the local economy’s—in this case Salluit and Kangiqsujuaq’s—main source of income, employment, and services (Faizuldayeva, 2016). Accordingly, the closure of a mine will have significant impacts on the overall social and economic well-being of such communities (Sheldon, Strongman & Weber-Fahr, 2002). Thus, poor closure planning can result in feelings of

hopelessness and despair, substance abuse, and in some cases, domestic violence (Bainton & Holcombe, 2018b; Ackermann et. al., 2018).

As this research sought to document the knowledge of community members regarding mine closure, it revealed that Inuit do not have a specific vision for every aspect of mine closure; they currently require more knowledge and education about what mine closure is. Once this knowledge is generated, community members will be better prepared to contribute to a closure plan that addresses their needs and attends to their values. However, participants revealed that they do have a clear vision for the environment and infrastructure when the mine closes. The interview participants touched upon specific concerns they have regarding the mine, such as the environment. In addition, participants voiced their desire for infrastructure, which was seen as having other potential uses when the mine closes down. This concern arose from their experience with the improper closure of Asbestos Hill. However, their understanding is not as clear when it comes to the remediation of tailings and waste storage facilities, and post-closure employment.

As mine closure is a generally neglected topic, it is not surprising that Inuit are not well informed about closure. This brings to the forefront the fact that Raglan needs to communicate more information about tailings and support for employees after closure. Several recommendations were made about how to improve this communication stream between the Inuit and Raglan Mine, including the recommendation to have more frequent engagements, rather than one special event each year (i.e., environmental forums). Engagements could be as simple as a newsletter or a more personal approach such as a virtual event or Raglan management coming to the communities to discuss the current and future operations.

This chapter highlights the need for ongoing education and consultation with communities around mine closure. Even though the Raglan Mine has a long history of positive

relationships with Nunavimmiut that dates back to the signing of the Raglan Agreement, this does not mean that they do not need to consider a social closure plan. In fact, there are gaps in their closure plan that need to be filled, including a social component. This research, in collaboration with the CPSC, contributes to the improvement of the shortcomings in knowledge and consultation regarding mine closure practices. In doing so, it contributes to the development of a socially acceptable closure plan for the impacted communities of Salluit and Kangiqsujuaq.

CHAPTER FOUR: CONCLUSION

4.1. Introduction

Mine closure is an inherent process in the lifecycle of a mine. It takes place when the minerals become depleted or when it is no longer financially feasible to continue mining. Some impacts of mine closure are effectively permanent, lasting for years longer than the mine itself, making closure one of the greatest sustainable development challenges within the mining industry (Hiyate, 2018; Kemp et al., 2007). Addressing social and economic impacts of closure, such as employment loss, weakened social structures, and health impacts that lead to feelings of depression, are among the most difficult challenges of a closure plan (Ackermann, Botha, & van der Waldt, 2018; Haney & Shkaratan, 2003; Hipwell et al., 2002). These social aspects of closure also receive little attention from the industry compared to the environmental and technical aspects of closure, which are now considered thoroughly in most closure plans (Haney & Shkaraton, 2003; January & Lee, 2019).

As the social aspects of closure have been historically underplayed, very few social closure plans exist (Stacey et al., 2010). A social closure plan will consider the impacts that closure has on local and Indigenous communities, as a result of continuous engagement and communication with those impacted (January & Lee, 2019; Xavier et al., 2015). However, many mine companies do not consistently engage with communities which is necessary for success (January & Lee, 2019; Laurencont et. al, 2019; Monosky, 2020). Even when a community is consulted, their expectations often differ from the stakeholder resulting in conflicting visions for closure (Moffat et al., 2016).

This research supports the claim that closure plans require a social component to avoid negative impacts to remote, mine-dependent, and Indigenous communities (Robertson &

Blackwell, 2014). Mine developments often bring employment, increased income, royalties, infrastructure, and services to local communities which will disappear when the mine closes. The loss of these benefits must be considered when developing a social closure plan. The impacts of closure are also more prominent in remote communities who have become dependent on the mine and struggle to reinvent themselves after mining (Bainton & Holcombe, 2018b; January & Lee, 2019; Robertson & Blackwell, 2014; Sandlos & Keeling, 2012). The social environment is also constantly changing throughout the mining operations making closure processes even more complex and challenging for communities and the companies they host (Laurencont et al., 2019).

To contribute to a greater understanding of social mine closure, this thesis documents the importance of community consultation in closure planning and highlighted the need for continuous engagement and communication with local and Indigenous communities. The purpose of this research was to document the knowledge and concerns of the Salluimuit and Kangiqsujuamuit related to the future closure of the Glencore Raglan Mine in Nunavik, Northern Quebec. The research objectives included: to determine the most important values of community members to be incorporated into the closure plan; to develop an understanding of what an ideal closure plan would look like as described by community members; to understand the what aspects of the local environment are most important to the community, to help prioritize steps for closure; and to articulate ways to improve community engagement and communication. Additionally, this research is meant to help the Raglan Mine Closure Plan Subcommittee (CPSC) visualize mine closure, while contributing to dialogue between the mine and community members.

This research involved a thorough review of relevant literature about past Arctic mine closures, closure guidelines and regulations in Nunavik so that I could understand past mistakes in similar environments, and to understand the limited regulations that govern social mine closure. Also, this research used interviews with the community members in Salluit and Kangiqsujuaq to learn about how they comprehend mine closure and gain a better understanding of community concerns and priorities. The results documented how Inuit envision mine closure to the best of their knowledge, identified key issues and priorities for closure, and indicated how Raglan Mine can improve their engagement and communication with the communities. This research can be used to inform the CPSC about Inuit visions for closure and adds to the growing body of literature on social mine closure. Not only will the use of this research help to strengthen relationships between communities and mining companies, it will also assist the development and implementation of a successful mine closure.

4.2. Key findings

This research demonstrated that mining has a wide range of impacts on communities and presents complex issues that need to be considered when developing a closure plan. Chapter 2 examined case studies on the closure of Canada's earliest Arctic mines, in order to understand the key elements and issues related to mine closure in remote Arctic communities. This chapter also introduced the concept of social closure, and discussed the various agreements and governing bodies that guide northern developments in Nunavik including mine closure.

The review of Canada's first generation of Arctic mines demonstrated the negative experiences associated with the lack of social closure planning. Few regulatory guidelines existed when these mines closed, which contributed to poor closure outcomes. When Rankin Inlet (Nunavut) shut down in 1962 it underwent rapid closure with little planning (Cater &

Keeling, 2013). As a result, closure efforts were chaotic and disorganized (Keeling & Boulter, 2015). Nanisivik Mine on northern Baffin Island in Nunavut announced its closure in 2001, giving the industry just one year to develop a closure plan (Lim, 2013). While Inuit were given the opportunity to state their concerns regarding the environment and economy, poor consultation and a lack of understanding led to poor closure practices (Bowes-Lyon, 2006; Lim, 2013). Lastly, the Asbestos Hill mine in Nunavik, which was abandoned in 1984, had no closure plan at all, resulting in environmental contamination and abandoned infrastructure (Carney, 2016).

In addition to the poor environmental conditions left behind at these mines, communities also experienced adverse economic conditions. Each community had become reliant on the mine for economic and financial support leading to economic hardship, a decrease in quality of life, out-migration, and community crisis when closure occurred (Bowes-Lyon, 2006; Lim, 2013). The negative experiences of closure at these mines created negative views of the mining industry from communities and distrust towards the mineral development sector (Carney, 2016). Subsequently, Raglan Mine has the opportunity to learn from the mistakes made in the historical case studies presented in this thesis, as it is also located in the Canadian Arctic, which presents unique challenges for mine closure.

The Raglan Mine, located in Nunavik Quebec is adjacent to the Inuit communities of Salluit and Kangiqsujuaq. The mine closure regime in Nunavik is shaped by the Inuit region's relationship with the Quebec government, detailed in Chapter 2. The James Bay Northern Quebec Agreement (JBNQA), signed in 1975, led to the development of various government bodies and legislative frameworks to govern different industrial developments on Inuit territory (Fabbi, Rodon & Finke, 2017; Rodon, 2014; Telewiak, 2001; Wilson, 2017). Although mine

developments must be approved by Makivik Corporation, mine closure plans do not (Makivik Corporation, 2014). In fact, it is the Quebec MELCC and MERN that govern mine closure in Nunavik (Monosky, 2020). The closure plan is often a technical document that obtains approval from Quebec government agencies, subject to their guidelines. The only legal body in Nunavik that has the authority to be involved in closure planning is the KEQC (Monosky, 2020), which reviews and comments on mine closure plans.

Given this research, it is no surprise that there are no social factors considered for closure plans in northern Quebec. Furthermore, there is no impact assessment required for the environmental, social, and economic impacts of closure (Beckett, Dowdell, Monosky & Keeling, 2020). Social closure however, is about more than employment, profits, and infrastructure. In fact, it is about the community's vision for a sustainable future. Many Inuit reflected on their need to maintain the infrastructure and rehabilitate the environment which enables them to participate in traditional activities. Without a social closure plan, the cultural activities that Inuit partake in become limited due to safety concerns and economic downfall. In turn, this diminishes the strength of their culture in the present and for future generations. If social components of a closure plan are not considered and economies are impacted, Inuit will have to uproot and migrate to other areas, leaving behind their cultural lifestyles as the economy becomes unsustainable. Therefore, cultural well being becomes a fundamental component of a social closure plan.

However, as Quebec's Mining Act governs and encourages companies to communicate with impacted communities, there is no mention of a social component requirement for inclusion in the final plan when it comes to closure (Beckett et al., 2020; Quebec MERN, 2021).

Therefore, Inuit communities remain largely unprotected from the social, cultural and economic impacts of mine closure.

Chapter 3 reviewed the current Raglan Mine closure plan and documented the knowledge and aspirations of the Nunavik Inuit for mine closure. The current closure plan fails to explain engagement methods, use community knowledge, and acknowledge negative social and economic impacts and plans for mitigation (Beckett et al., 2020). Although the plan makes an attempt to address these impacts on page 68, stating that "aspects of environmental, societal and economic performance" were considered, nowhere in the document were these criteria defined (Beckett et al., 2020). While the current closure plans meet Quebec's government guidelines and requirements, it is clear that the social component of the closure plan could be improved.

Interviews were used to help improve the understanding of each community's knowledge and concerns regarding closure. There were four closure priorities revealed that regarded infrastructure, the environment, post-closure employment, and communication with Raglan Mine. Participants expressed great interest in making use of all infrastructure – electrical, transportation, and support as their infrastructure needs are unique. There remains a high cost to construct infrastructure due to the region's remoteness, extra materials are required to endure the most extreme weather conditions, and often a company from the south needs to be hired as the tools and skills required are not available in the communities (Mills & Sweeny, 2013; Rodon & Schott, 2014). Therefore, having access to existing infrastructure and the repurposing of it would be of great value to Salluit and Kangiqsujuaq. Understanding the value of the infrastructure to the Inuit is important because the current closure plan has been developed on the premise that all infrastructure will be dismantled and follow the decommissioning schedule. All assets and equipment will be demobilized or buried on site, and materials sent south will be buried or

burned (SNC-Lavalin & Raglan Mine, 2018). This does not align with the Right of First Refusal given to the Inuit of Nunavik as stated in the Raglan Agreement.

Inuit rely heavily on the environment making the environment a common discussion topic throughout the interviews. All respondents who communicated the importance of the environment, mentioned the need to protect it post-closure. However, participants rarely mentioned tailings management, which has the potential to become the main pathway of contamination to the environment. It became evident during interviews that participants have little understanding of the complex issue of tailings and the challenges involved with managing them. If the potential impacts of mine tailings are not fully understood by the community, they may have difficulty documenting their concerns and ideas regarding tailings management. This result suggests that communication from Raglan Mine about tailings needs to be improved.

Indeed, interviews suggested that many participants were unaware of the possibility of future closure of the mine. However, individuals, and families need to be prepared as those employed will lose their main source of income. Those that did understand that the lifespan of a mine is not infinite expressed that they want to be involved in the management and monitoring post-mining. This would allow continuous employment for the Inuit and compensate somewhat for the loss of mine-related employment. Raglan Mine has provided the communities with money through profit sharing under the Raglan Agreement. However, this funding will stop alongside mining operations. The topic of employment and economic impacts is important as it encourages the creation of a closure plan that includes Inuit in post-closure management and monitoring practices.

Raglan Mine has a strong history of joint management to oversee operations that take place at the mine. After the signing of the Raglan Agreement, the Raglan Committee was

established, followed more recently by the creation of the CPSC in 2018. Both of these committees have Inuit representatives and Raglan Mine employees as committee members to discuss the activities at the mine. Raglan Mine also holds annual forums in Salluit and Kangiqsujuaq to discuss operations at the mine and have hired community liaisons for each community. Interview participants indicated that they appreciate the efforts that Raglan Mine makes to communicate with communities, but some also stated that there is always room for improvement. It was recommended that Raglan hold more frequent events for continuous communication and also to take a proactive approach to all operations at the mine – not just closure. Lastly, interviews demonstrated that many community members do not fully understand when the mine would close, which is something that Raglan Mine could communicate better.

4.3. Implications

This thesis demonstrated that there are few exemplary mine closure cases, and even fewer that consider the social aspects of mine closure. This research contributes to a new approach to closure planning for communities and industry. In fact, this approach to closure planning is ever more pressing with the growth of mineral development and other industries in the North. Communities are demanding more involvement in the decision-making process regarding developments on their land (Moffat et. al., 2016). Therefore, the research should not end here. Communities should be included from the onset of such developments – whether it be mining or forestry and fracking, as they value communication and engagement. Developing trust and a positive legacy within and outside of the mining industry is possible when open and honest communication occurs. Communities need to be protected from the loss of industry as it brings employment, increased income, royalties, infrastructure, and services (Robertson & Blackwell,

2014). It is inevitable that a mine will close down, and future research should continue to examine different strategies to support communities after closure.

By analyzing past closure failures, conducting interviews and reviewing the Raglan Mine closure plan, it became evident that a social closure plan is necessary for successful closure to take place. Plans for closure must be detailed and consider social and economic impacts that were outlined in Chapter 2. Primarily, provincial policies need to be adjusted to provide more specific and clear closure guidelines that make note of a social component. This is beyond the obligation of a mining company. Instead, it falls in the hands of government officials who have required a closure plan to be developed. As the government provides guidelines for closure it should require social objectives to be included to mitigate the social impacts of closure (Monosky, 2020).

Open and transparent dialogue between communities and the company is important. As illustrated in this thesis, communication is one of the most important aspects of closure, as it can determine the success of other closure factors. In order to protect impacted communities from closure, companies must have consistent, thoughtful, two-way communication with those communities in order to understand their needs and concerns. Without improved communication, a successful closure will not be possible. The recent creation and work of the CPSC encourages Inuit to voice their concerns with Raglan Mine. Beyond communication, though, is the importance of communities being directly involved in mine closure. Community participation needs to be included in Raglan Mine's closure plan in order to avoid failure and to maintain a positive relationship between Indigenous communities and the resource development sector. By engaging with the communities, a closure plan that is more in line with the vision of the Inuit can be developed.

Communication tools need to be developed to improve engagement with mining communities. Such tools could involve monthly brochures documenting mining operations, or quarterly videos that show Inuit what is taking place at the mine. Another option would be to create a more user-friendly website that includes a tab on community involvement. Currently, the Raglan Mine website has a 'Community Relations' section stating it has increased engagement with community partners. However, nowhere does it define what engagement tools are used or how often. This could be improved. Therefore, ongoing communication and engagement, in a variety of ways, would help keep communities informed about closure planning.

The results of the research presented in this paper can be used to inform Raglan Mine of key considerations for closure planning, but also inform the broader resource development industry. The connection of Inuit to their land is beyond a desire to profit from natural resource extraction which needs to be taken into consideration (Robertson & Blackwell, 2014). This research reflects the hard work and care that Raglan and its Inuit partners on the CPSC are undertaking in order to find the best approach possible to the future closure of the mine. This will allow for Raglan Mine to make changes to their current closure plan to account for the social aspects of mine closure. Additionally, this research successfully supports the claim that Indigenous communities and the resource development industry can work together as demonstrated by way of the CPSC.

As indicated in this thesis, a social component needs to be developed in order for successful mine closure to occur. It stresses the importance of community engagement and collaboration to develop a social closure plan that satisfies all parties. The use of engagement and communication applies to more than just the mining industry and only benefits parties for all types of projects. Such meaningful interactions allow Inuit to feel empowered and included in

decisions that will ultimately impact their quality of life. As a result, these types of collaborations help to promote good relationships between communities and the industry, and also encourage companies operating in the region to develop a social closure plan.

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APPENDICES

Appendix I: Letter of Support - Raglan Mine

April 9th, 2018

ICEHR Memorial University of Newfoundland
IIC-2010C
230 Elizabeth Avenue
St. John's, Newfoundland
A1C 5S7

Subject: Support Research of Vanessa Potvin

On behalf of the Closure Sub-committee of the Raglan Committee, we are writing to express our support for the research proposed by the Memorial University TERRE-NET research team, including master's student Vanessa Potvin. The Raglan Committee is composed of representatives from Glencore Canada Corporation – Raglan Mine, Salluit, Kangiqsujuaq, and Makivik Corporation. The Raglan Committee recently formed a Closure Sub-committee including Inuit partners from Salluit and Kangiqsujuaq, representatives from the management of Raglan Mine, Makivik Corporation, Université du Québec en Abitibi Témiscamingue and TERRE-NET. As part of its mandate to engage Inuits in the formulation of a closure plan for Raglan Mine, the sub-committee supports the proposed research by Vanessa Potvin into Inuit knowledge and perceptions of mine closure plans. We understand this research will take place in spring-summer 2018, and the results will contribute to the sub-committee's work. Sub-committee members, including Inuit partners and Raglan Mine employees, are committed to support the successful conduct and communication of this research.

Sincerely,

On behalf of Glencore Canada Corporation – Raglan Mine,

Charles A. Levac, Eng
Risk, Safety and Environment Manager

C.C. (electronic copy)
Amélie Rouleau, Director, Public Affairs, Communications and Community Engagement

Appendix II: Letter of Support - Makivik Corporation

Thursday, April 5, 2018

SUBJECT: Letter of support for project "*Improving Closure and Reclamation Strategies through Community-Based Participatory Research at the Raglan Mine, Nunavik".*

On behalf of the Mine Closure Sub-committee of the Raglan Committee, we are writing to express our support for the research proposed by the Memorial University TERRE-NET research team, including master's student Vanessa Potvin. The Raglan Committee is composed of:

- Paul Papigatuk, Salluit;
- Lukasi Pilurtuut, Kangiqsujuaq;
- Adam Lewis, Makivik Corporation;
- Amélie Rouleau, Raglan Committee Chair, Raglan Mine;
- Charles Levac, Raglan Mine;
- Jean Drolet, Raglan Mine.

On March 15th 2018, the Raglan Committee formed a Mine Closure Sub-committee including Inuit partners from Salluit and Kangiqsujuaq, representatives from the management of Glencore Raglan Mine, a representative from the Makivik Corporation, and TERRE-NET. As part of its mandate to engage Inuit in the formulation of a closure plan for the Raglan Mine, the sub-committee supports the proposed research by Vanessa Potvin into Inuit knowledge and perceptions of mine closure plans.

We understand this research will take place in spring-summer 2018, and the results will contribute to the sub-committee's work. Sub-committee members, including Inuit partners and Glencore Raglan employees, are committed to supporting the successful conduct and communication of this research.
Sincerely,

_____
Adam Lewis,
Raglan Committee member
Makivik Corporation

Appendix III: Interview Guide

Introduction

I am a graduate student in the Department of Geography at Memorial University. As part of my Master's thesis. My research aims to investigate the involvement of the Nunavik Inuit communities of Salluit and Kangiqsujuaq in closure planning, in order to develop better strategies to incorporate Inuit knowledge and values into the closure plan. As part of my research, I am part of the Raglan Mine Closure Plan Sub-Committee composed of a variety of researchers and experts, including representatives from the communities of Salluit and Kangiqsujuaq. The purpose of this study is to develop new approaches to mine closure planning through the inclusion of an Inuit voice.

A major topic of discussion that resulted from the Closure Plan Sub-Committee Meeting was to ensure that everyone is and remains well informed. This includes members of the Closure Sub-Committee, the Raglan Committee, the Raglan Mine staff, and the members of Salluit and Kangiqsujuaq. Therefore all parties can have a common understanding of steps being taken to ensure that the approach to mine closure will be holistic and encompassing of all parties' visions. It is my job to help inform these communities, but more importantly, to listen to what their concerns and wants are in regards to the closure of the Raglan Mine to ensure the aforementioned point is satisfied.

Preliminary Questions

- ( ) Male () Female () Other
- () 18-25 () 25-30 () 35-40 () 45-50 () 50-55 () 55-60 () 60+
- Highest level of school completed
- Post-secondary or vocational training
- Previous work experience:

Section 1

1a. Do you have any previous work experience or committee work experience related to mining
b. If so, when was that and how long did you work there?
c. Are you still employed with the mining industry – which company?

2. Have you ever worked at Raglan or for a mining company?

3. Have you ever visited the Raglan Mine Site?

Section 2

The Raglan Mine is scheduled to close its operations in the year 2041. The government of Quebec has a law that requires all mining companies to set aside funds and to submit an updated mine closure plan every five years. The last mine closure plan submitted for Raglan Mine was in May 2018 – at the time, Glencore is required to deposit a financial guarantee to support cost of closure and site restoration.

In 2018 when the mine closure committee was formed, the 2017 version of the mine closure plan was presented to the Raglan Committee. Glencore was informed that the government has asked to resubmit a revised version by May 15, 2018. Due to short notice and the legal requirements that needed to be met, the revised closure plan was not presented to Raglan committee before submitting to the government. Resultantly, Glencore has made the commitment to present the 2023 closure plan to the committee, prior to government. For this reason, the Sub-Committee Closure Group has been created to engage Inuit communities in the final closure plan.

In this case, restoration means that Glencore will:

- close all open pits
- secure the tailings with geo membrane or new technology
- close all mine shafts
- clean any contaminated water from the site
- remove all buildings (garages, warehouses, accommodation complex, fuel tanks)
- clean up DB, remove all infrastructure
- hand over the road and airstrip to the government(s)

What else can be done to ensure the integrity of the site after the mine closes?

Under this scenario, and according to the Raglan Agreement, the Inuit of Salluit and Kangiqsujuaq have the ***right to first refusal*** – for any and everything at Raglan, including all buildings and assets.

4. What buildings or assets would you like to own for yourself or for your community – do you have a plan for that?

5. Salluit and Kangirsujuaq, now have 4 seats on the Mine Closure Sub-Committee at Raglan. What message(s) would you send to them regarding mine closure?

<u>Section 3</u>

Mining activities impact the livelihood of people who live in the area and on the natural environment. They provide jobs – pay compensation, bring in workers from the south, alter Inuit access to areas on the land and change the landscape, create open pits, underground mines, build roads, airports, dump sites, garages, accommodation complexes, water treatment plants, tailing and tailings ponds. Mine closure plans ensure that companies plan for the day when all operations cease, that little to no trace of the mine will be left. This will require the filling of open pits, closing mine shafts, removing all infrastructure from the property and cleaning the area (water, ground, etc).

6a. What do you value most about the land where you participate in your traditional activities?
b. Which areas are most important to you - those that should have priority for reclamation versus others? Why?

7. In 2041, when Raglan closes the mine- how would you, as a person from Salluit or Kangiqsujuaq, want the reclamation process to proceed – what should it entail, when should it be started?

- cleaning of lakes and rivers at Deception Bay and ensuring safe drinking water
- ensuring that the salt used to control dust and its accumulation is not impacting the fish populations at Pangaliriaq
- ensure that benthos are healthy – high numbers and able to live in our lakes and rivers – as all fish eat benthos – it is expected that if benthos is healthy, so will the fish
- measure the accumulation of toxins in our bodies now and for the next 20 years to see if we have increased levels of mercury, or other toxins in our systems due to mining activity
- close all open pits
- close all mine shafts and tunnels
- the *Right to First Refusal* for Salluit and Kangiqsujuaq for things such as the accommodation complexes, garages, warehouses, vehicles, heavy equipment, furniture…
- the removal of all facilities from the Katinniq area
- a long term plan and insurance for the Inuit against erosion or failure of the tailings cover
- promise that new science and technology that can lower the impacts
- hand over or selling of all infrastructure to the Inuit (buildings, equipment, etc)
- ensure there are funds available to the Inuit so that they may monitor the tailings for the next 50-100 years
- Other

Section 4

8. The Raglan Mine is making plans for what the land will look like after mining. Have you heard about these plans?

9a. Describe how you envision mine closure. What are some of the concerns you have with the mine being shut down in the future?
b. How would you like these concerns to be addressed?
c. What is the most important aspect to you in regards to the mine being shut down? Why?

10. When thinking about mine remediation, what do you consider to be the most important aspect of the environment to be considered?

11. How do you think the communities could and should be involved in mine closure and clean up planning?

Section 5

12. How do you gather information about the mine's operations and environmental issues? -

13. In the past, the Raglan Mine has held Environmental Forums to help engage with the community. Could you describe what you think the benefits are of these forums, if you attended them?

14. Would you say you feel well informed about the mining activities in the region? Why or Why not?

15. Overall do you think Raglan has been successful at communicating with your community?

Section 6

16. That concludes the interview. I would like to thank you for your participation. Do you have any other information you would like to provide me with at this time?

Once the project is complete, the information will be compiled into a summary report. Copies will be available at the community liaison officer office.

Appendix IV: Interview Consent Form

Informed Consent Form

Title:	Improving Closure and Reclamation Strategies through Community-Based Research at the Raglan Mine, Nunavik
Researcher(s):	Vanessa Potvin, MSc Candidate, Memorial University Department of Geography, vnpotvin@mun.ca, (705) 321-4705
Supervisor(s):	Dr. Arn Keeling, Memorial University, Department of Geography, akeeling@mun.ca, (709) 864-2429

You are invited to take part in a research project entitled *"Improving Closure and Reclamation Strategies through Community-Based Research at the Raglan Mine, Nunavik."*

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Vanessa Potvin, if you have any questions about the study or would like more information before you consent.

It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

Introduction:
I am a graduate student in the Department of Geography at Memorial University. As part of my Masters thesis, I am conducting research under the supervision of Dr. Keeling and is funded by the Social Sciences and Humanities Research Council. My research aims to investigate the involvement of the Nunavik Inuit communities of Salluit and Kangiqsujuaq in closure planning, in order to develop better strategies to incorporate Inuit knowledge and values into the closure plan. As part of my research, I am part of the Raglan Mine Closure Plan Sub-Committee composed of a variety of researchers and experts, including representatives from the communities of Salluit and Kangiqsujuaq.

Purpose of Study:

The purpose of this study is to develop new approaches to mine closure planning through the integration of Indigenous knowledge and values, making this research meaningful and relevant for both Indigenous communities and the resource development sector.

What You Will Do in this Study:
If you wish to take part in this study, you will be asked to participate in an interview with me. During the interview, I will ask you questions surrounding your land-use activites and land values. Subsequently, questions will be asked relating to Raglans engagement with your community. I will also ask questions relating to your vision of mine closure.

Length of Time:
I will be staying in Salluit for a total of 5 days, and Kangiqsujuaq for 7 days. I will be conducting interviews that are approximately one to two hours each. However, if you wish to expand on the topic or talk about related ideas, you are more than welcomed to do so.

Compensation
As a result of participating in this study and as a token of my appreciation, you will receive a small gift from me, as well as have a $50 credit put into your account at the Co-op.

Withdrawal from the Study:
a) You may stop participating during the interview, for any reason, it you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researchers, Memorial University, or any other group associated with this project.
b) In the even you withdraw from the study after the data has been collected you can approach me personally, call me directly at 705-321-4705, or email me at vnpotvin@mun.ca and your data will be destroyed as soon as possible, no later than two weeks after the request.
c) It will be impossible to withdraw from the study after December 1, 2018, once I will have analyzed the data for publication of my thesis.

Possible Benefits:
Your participation in this study will have potential benefits to:
a) Your community and other northern Canadian communities that have been affected by large scale resource development. This research will result in the incorporation of community values and knowledge allowing for a greater and new understanding of what mine closure should entail. Newly developed approached to mine closure planning, relevant to Indigenous communities and the resource development sector will result.
b) The scientific/scholarly community and/or society as a whole. Your pariticpation will contribute to improve mine closure practices and will contribute to scholarly and public debated around mine closure and reclamation in northern Canada.

Possible Risks:
I am asking you to share with me personal opinions and confidential information, and you may feel uncomfortable answering some of my questions. This research poses minimal risk to participants. Given that this research is about personal experience and Indigenous knowledge and values that pertain to mine closure practices, there is the possibility that some questions will elicit negative memories of mine development in the region, for instance, memories associated with the closed and abandoned Asbestos Hill mine. These memories may include the loss of traditional livelihoods such as hunting due to environmental impacts of mining. It may also elicit negative memories that result from unhealthy relationships with the mining industry/company. In order to mitigate this potential harm, you – the participant - will be fully aware of the subject of the interviews and focus groups. I am also aware of the issues surrounding the gathering of local and Indigenous knowledge (LIK) and values, with the intent to acknowledge the full breadth of LIK and values in my research, including its moral, spiritual, and ethical dimensions. Therefore, please remember that if you do not wish to answer of the questions during the interview, you may say so and I will move on to the next question.

Confidentiality:
All information you supply during this study will be confidential and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Your identity, personal information, and data obtained from this interview will be safe guarded from unauthorized access or disclosure.

Your personal information will be recorded separately from the data collected (field notes, interviews) and your identity will be coded (i.e., your personal information will be replaced by a code, which allows to re-link your actual name with the code if necessary).

Individuals will be provided their transcripts to review and omit any data they do not feel comfortable sharing. However, final documents and reports will be reviewed by the Closure Plan Sub-Committee only (in digital format). This allows for expert opinions on the documents/reports to be given from the community representatives.

Anonymity:
You may consent to have your name to be used in publication or you may choose to remain anonymous. If you choose to remain anonymous, you will be identified generically or through a pseudonym, and other personal identifiers (such as gender) will be avoided.

After your interview, and before the data are included in the final product (e.g. direct quotations), you will be able to review the transcript of your interview, and draft paper, and to add, change or delete information from the transcripts or draft as you see fit.

Photographs may be taken. With your permission, you are consenting to allow your photograph to be made public in which community members will know that you have participated in this

research. Such photos will be used to make updates to the Closure Plan Sub-Committee of the research, but mainly used in the final thesis report.

The shared history and close-knit nature of your small community may create a situation where you can be identified by the stories you share, but I will make every possible effort to protect requests for anonymity and for information to be kept confidential. Some participants might also be concerned about the risk to themselves if they criticize the company. In order to best mitigate these risks to participants, the information they provided will be kept confidential, no names will be recorded in the final report, so at best all one can do is assume what one said. Under no circumstances will participants be pressured to participate in the interviews, or answer specific questions.

Recording of Data:
During the interviews, I will use audio recording which will later be transcribed. Interviews will be conducted in English, and if necessary, an interpreter will be available to facilitate the interview if you prefer speaking in Inuktitut. The interpreter will be required to sign a confidentiality agreement to ensure that all information shared by participants during the interviews remains confidential, and that they will not share information with anyone other than myself. If interviews are undertaken in Inuktitut, the interview transcript that is to be returned to the participants for review will be again translated by the interpreter

Use, Access, Ownership, and Storage of Data:
The data obtained from the study will be used for the purposes of this research. The data will be potentially provided to:

1) Raglan Mine Closure Plan Sub-Committee.

Participants will only have access to their transcripts and not the draft paper. The draft paper will only be made available to the Closure Plan Sub Committee for review, before final dissemination. The final paper will be made public.

Access to recorded interviews will be restricted to myself, and/or my supervisor Dr. Arn Keeling. All interviews will be stored on encrypted computers. The information gathered will be kept for a minimum of 5 years, in my supervisor's office, as required by Memorial University policy on Integrity in Scholarly Research, after which I will destroy all electronic files and shred any paper material that contains primary data (interview transcripts, field notebooks, etc.).

Inuit of Salluit and Kangiqsujuaq may wish to retain and archive copies of the audio interviews or transcripts. Should this be the case, you will be informed, and you will have permission to opt out of the final repository should you desire.

Reporting of Results:

Interview data files and interview transcripts will not be distributed, sold, or disseminated in any way, though selected quotes may be used in a published essay, *with permission.* The final report will be used for my master's thesis which will be available at Memorial University's Queen Elizabeth II library, and online at http://collections.mun.ca/cdm/search/collection/these. Before the final report is made public, it will be reviewed by the Closure Plan Sub-Committee.

Sharing of Results with Participants:
All participants will be sent transcripts of interviews, at which point they may indicated deletions or refuse permission for use of the transcript. Results of the research will be reported to the community through Environmental Forums and public dissemination of all research products (i.e., research publications). Finally, a copy of your transcripts will be provided to you upon completion of this study.

Questions:
You are welcome to ask questions before, during, or after your participation in this research. If you would like more information about this study, please contact: Vanessa Potvin at vnpotvin@mun.ca. If you wish to contact my supervisor directly, he can be reached at akeeling@mun.ca.

ICEHR Approval:
The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

Consent:
Your signature on this form means that:

- You have read the information about the research.
- You have been able to ask questions about this study.
- You are satisfied with the answers to all your questions.
- You understand what the study is about and what you will be doing.
- You understand that you are free to withdraw participation in the study without having to give a reason, and that doing so will not affect you now or in the future.
- You understand that if you choose to end participation **during** data collection, any data collected from you up to that **point will be destroyed**.
- You understand that if you choose to withdraw **after** data collection has ended, your data can be removed from the study up to December 1, 2018 and will be destroyed no later than two weeks after your request.

I agree to be audio-recorded ☐ Yes ☐ No

I agree to be photographed	☐ Yes ☐ No
I agree to the use of direct quotations	☐ Yes ☐ No
I allow my name to be identified in any publications resulting from this study	☐ Yes ☐ No
I agree to have any information I provide to be incorporated into the final master's thesis, which I understand will be available at Memorial University's Queen Elizabeth II library, and online at http://collections.mun.ca/cdm/search/collection/these	☐ Yes ☐ No

By signing this form, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

Your Signature Confirms:

☐ I have read what this study is about and understood the risks and benefits. I have had adequate time to think about this and had the opportunity to ask questions and my questions have been answered.

☐ I understand that the data I provide will be made accessible to the researcher and/or her supervisor, with the final report to be reviewed by the Closure Plan Sub-Committee.

☐ I agree to participate in the research project understanding the risks and contributions of my participation, that my participation is voluntary, and that I may end my participation.

☐ A copy of this Informed Consent Form has been given to me for my records.

_____ _____

Signature of Participant Date

Researcher's Signature:

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

Signature of Principal Investigator	Date

Appendix V: Research Summary for Recruitment

My name is Vanessa Potvin, and I am a student in the Geography Department at Memorial University of Newfoundland. I am conducting a research project called *Improving Closure and Reclamation Strategies through Community Based Research at the Raglan Mine, Nunavik* for my master's degree under the supervision of Arn Keeling. The purpose of the study is to investigate the involvement of the Nunavik Inuit communities of Salluit and Kangiqsujuaq in closure planning in order to develop better strategies to incorporate Inuit knowledge and values into the closure plan.

I am contacting you to invite you to participate in an interview in which you will be asked to identify aspects of the land you think are important in which questions will refer to types of land use activities you participate in and what values you hold in regards to the land. Questions will also refer to mine closure, and what your vision of mine closure is. Participation will require *one hour* of your time and will be held at *Raglan Mine community liaison officer's office.*

It would be appreciated that those participating in the study participate in traditional land use activities, but also are – at minimal – somewhat involved/interest/knowledgeable about the Raglan Mine.

If you are interested in participating in this study, please contact me to arrange a meeting time. I can be reached at 1-705-321-4705 or vnpotvin@mun.ca.

If you have any questions about me or my project, please contact me by email at vnpotvin@mun.ca or by phone at 1-705-321-4705.

If you know anyone who may be interested in participating in this study, please give them a copy of this information.

Thank-you in advance for considering my request,
Vanessa Potvin

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as your rights as a participant, you may contact the Chairperson of the ICEHR at icehr.chair@mun.ca or by telephone at 709-864-2861.