

**MINERAL SECTOR DEVELOPMENT AND THE COMMUNITY:  
SOME CANADIAN EXPERIENCES**

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# **MINERAL SECTOR DEVELOPMENT AND THE COMMUNITY: SOME CANADIAN EXPERIENCES.**

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## **1.Introduction:**

Mining has been a major economic activity in Canada for the last century. It has made a valuable contribution to the development of the Canadian economy and to the standard of living of Canadians. The benefits include jobs and incomes, tax revenues and the social programs they finance, foreign exchange earnings and all that they purchase for Canadians, frontier development, support for the national infrastructure, and economic diversification into a broad range of economic activities centred on mining. At the same time, mining continues to be controversial because it has generated costs of an environmental, social and financial nature, especially at the level of local communities. The benefits, which could accrue to the local communities, have the potential to be more substantial than they have sometimes been in the past. Indeed, the principal objective of the new generation of mine enterprise/community relationships, which have been in process of negotiation in the last decade, is to improve the net benefits of mining activity for the benefit of the local communities that were often overlooked in the past.

The objective of this paper is to analyze some Canadian experiences with respect to the economic, social and environmental implications of mineral sector activity on local communities close to the mine sites. From this analysis, some perspectives, insights, and ideas are distilled, which may be useful for those countries of the Latin American region currently experiencing rapid growth of mining , notably Bolivia, Chile and Peru.

There are various types of mining communities and their associated mines. Therefore it is difficult to generalize about the impacts of mining on the community and about how the net benefits could be improved and the negative impacts reduced or eliminated. The range of mining communities includes:

- Long-established but isolated mining towns which rely solely on the single enterprise;
- A variant of the above: long established company towns developed by the mining enterprises themselves;

- Long established communities with diversified economic bases, which then become homes to new mines;
- “Fly- in / fly-out” mining, or mines without adjacent communities;
- Temporary tented encampments in areas of intense mineral exploration and possible mine development;
- Major long-established mining cities in which it has been possible to develop a broad range of mineral related economic activities over time;

This study begins with a general discussion of mining and its interactions with communities in the Canadian setting. Then the economic and social effects are examined in the Canadian context. The particular issues arising from the expanding mining activities in Indigenous regions of the country are then examined briefly. A number of case studies of mining and the community in Canada are analyzed. The first is the Voisey’s Bay nickel project and the attempt there to negotiate an equitable economic, social, and environmental agreement among two Indigenous groups, the Provincial Government, the Federal Government, and the International Nickel Company of Canada (INCO). The second case is the Diavik diamond mine , in the Northwest Territories. This is important as another attempt to negotiate a fair agreement, prior to start-up, between indigenous groups, Governments, and the enterprise. A mature mine in an established region of the country, namely potash in Sussex New Brunswick, is then examined as an example of a highly successful mine/community relationship. The case of Sudbury, a potential “mining metropolis,” is then examined. Finally, some insights emerging from the Canadian case studies are summarized.

## **2. Mining, the Community and Public Policy in Canada**

The most widely-accepted vision for the development of Canada’s mineral sector, agreed upon by Mines Ministers of all levels of government, industry, labour, Aboriginal groups and environmentalists is that outlined in the **Whitehorse Mining Initiative** of 1994:

*... a socially, economically, environmentally sustainable and prosperous mining industry, underpinned by political and community consensus (Government of Canada, 1996, p.1).*

More specifically, the objectives of mineral policy at the federal have been defined as follows:

1. *“To integrate the concept of sustainable development in federal decision-making affecting the minerals and metals industry;*
2. *To ensure the international competitiveness of Canada’s minerals and metals industry in the context of an open and global trade and investment framework;*
3. *To advance the cause of sustainable development of minerals and metals at the international level through partnerships with other countries, stakeholders and multilateral institutions and organizations*

4. *To establish Canada as a global leader in promoting the safe use of minerals and metals related products;*
5. *Aboriginal involvement in minerals- and metals-related activities;*
6. *To provide a framework for the development and application of science and technology to enhance the industry's competitiveness and environmental stewardship”*  
(*Ibid.*, p.5.)

The above objectives emphasize environmental sustainability, community orientation, and Aboriginal Peoples as well as technology and economic competitiveness. Although not spelled out in detail, the competitiveness dimension presumably would include sub-objectives of a more traditional character, such as employment and income-generation into the distant future.

However, perhaps surprisingly, this statement of objectives does not include the strengthening of the whole cluster of economic activities which surround mining and generate a large proportion of the economic and social benefits to local communities and the nation, and which influence the long-term economic sustainability of the whole mineral sector.

#### **A. Economic Impacts of Mineral Activities on Communities**

There are many possible impacts of mineral sector activity on the local community. These depend on the size of the mine, mine longevity, the development of a number of mines in a mining region, the development of other related mineral activities, and the initial size and degree of economic diversification in the mining towns. Of special importance is “remoteness” or the location of the mine relative to communities. The most direct and important impact of a mine is employment creation and income generation, and the subsequent stimulation of other economic activities, serving consumer needs and servicing the mine, which also create employment and income.

Whether a small community or town is able to capture some of these economic activities and diversify its economic base and employment structure depends on a variety of factors. Among the determinants of the location of the provision of various types of consumer or minerals-related goods and services would be the following:

- (a) The size, duration, and degree of diversity of the local mining activities,
- (b) The pre-existing community, its size and the range of economic activities already undertaken there, and
- (c) The remoteness of the mine location and that of the relevant communities.

The establishment of a mine and the employment it generates in a community will expand the demand for a wide variety of consumer goods and services. Some of these will tend to locate near the new and/or expanding consumer market, which accompanies a mine. This could include retailing of many sorts, hotels, restaurants and bars, automotive sales and repair,

recreational services, every other imaginable personal service, medical services, some financial services, and some business services. In terms of manufacturing for the local consumer market, this might begin with bake shops, soft drink bottling and some other lines of food processing, and then move into more sophisticated products requiring larger local markets.

There would probably be relatively few inputs into the mining process which could be provided from within a small isolated mining community. More complex equipment, especially that requiring major economies of scale in its production, usually cannot be produced in small remote towns. However, there are various services, which might be provided at the local community level. For example, local enterprises might provide housing, maintenance services, roadway construction, construction of sheds and some simple mine buildings, inputs such as sand and gravel, and food provision for mine personnel.

As a mine community matures and expands, there are other types of inputs, which can be provided to the mine (such as vehicle repair, machine shop services, welding, sheet metal work, plumbing and electrical services). These may be followed by complex construction projects, and perhaps the repair and assembly of basic steel-work (such as vats, bins and hoppers.) Ultimately, when a mine community expands greatly, there may be a growing variety of enterprises locating there to provide inputs for the mine activities in the region, perhaps for other regions and eventually for other countries. In major mine cities, some more complex mine equipment may be produced, especially the high bulk- lower value products which are relatively simple to produce, of a custom-designed character, and/or relatively expensive to transport long distances, e.g. some underground equipment (such as shaft furniture or roofing bolts,) some infrastructural equipment, steel pipe, wire products, hose products, ventilation ducting, metal structural products, drill steel and bits, and perhaps explosives and chemical products. A variety of services are likely to be provided in such mining cities: exploration, mining, and processing consulting, repair and maintenance services, mine decommissioning services, machinery rental, sales, repair, and re-building, cast metal products, legal and financial services especially for mine activities.

As the local community expands, there will also be a steady expansion of the provision of public goods and social services such as education including ultimately Universities, health facilities including hospitals, infrastructural services (sewage systems, paved roads, parks, squares and sidewalks) water systems, electrical systems, recreational facilities, and the local government bureaucracy to administer the provision of many of these public activities. If the mine community eventually develops into a mining metropolis, the range of these activities may expand further.

In sum, the development of mining activities may lead to the expansion of a wide variety of linked economic activities. In some cases, they may contribute to the development of major urban centres. However, small remote mining communities whose fate is tied to a single mine

may lose their *raison d'être* when the ore body is depleted. When the mine shuts down, such mining communities may become ghost towns, a phenomenon well known in most major mining countries.

## **B. Indigenous Peoples and Mineral Development**

The development of mineral activities increasingly occurs in areas occupied by Indigenous peoples, because mineral exploration and mine development are being pushed ever further into frontier areas of the north of Canada. In these areas, the Indian and Inuit peoples are often a majority of the population, and they continue as the owners of the mineral resources in many cases.

The introduction of mining in Indigenous areas creates important potential benefits but also a number of challenges. Some of the benefits are the same as the general benefits of mining, namely employment, income generation, tax payments for local and regional governments and everything that can be done with public revenues in terms of social expenditures, infrastructure and community development. Indigenous communities also have the possibility of capturing some spin-off benefits from the expenditures of mining enterprises on locally purchased inputs.

The First Nations peoples may benefit enormously in future decades by systematically developing the relevant mining skills so that they can dominate mining activities in the North. Ultimately, this should include partial or complete ownership of some mine enterprises. Their proximity to northern mine-sites and the distance commuting system should facilitate this trend.

There may also be social problems for Indigenous Peoples. Mining activities and the relocation of outsiders into indigenous areas may introduce transient mining personnel who may bring with them alcohol, different patterns of consumption, new life-styles. These may disrupt community life and traditional ways of living, with adverse impacts on traditional societies generally. However, in most but not all parts of Canada, these negative effects occurred well before the advent of mining. Second, there may also be impacts on the economic activities of indigenous peoples. Hunting, herding or foraging areas risk being disturbed or destroyed. Rivers may be polluted and fishing activities damaged. Third, the environmental impacts of mining may affect the health of indigenous peoples directly through air and water pollution and indirectly through their impacts on fishing or on economic activities.

If there are significant net benefits for indigenous communities, it is likely that they would support and participate in environmentally sound mineral development activities in their territories or territories adjacent to their communities. However, the key concepts for willing support by Indigenous Peoples for mining projects in Canada are (a) net benefits, (b)

participation, and (c) respect for the environment. In the words of Dr. Billy Diamond, Grand Chief of the Cree:

*The more experienced mining companies realize that, for them most part, Indigenous Peoples and the Cree in particular are NOT anti-developmental. We welcome the economic benefits, training and technological transfer that are associated with large resource projects. But we do insist on one criteria ..... First and foremost, all aspects of the partnership must be co-authored and co-managed by all the partners (August 24, 1999).*





Historically, indigenous communities were regarded as non-participants in negotiations with governments and/or private corporate ventures concerning the terms and conditions under which natural resources would be extracted. Thus, for many years, their claims were ignored and they were excluded from such deliberations. With the recognition during the 1960s and 1970s, that there was legitimacy to the Aboriginal land claims, governments adopted other forms of “pseudo-participation” which were essentially “non-participatory.” During the 1990s, there has been a change in the position of the First Nations peoples. The Supreme Court of Canada has recognized native land claims based on treaties that have not extinguished title to land or resources in many areas of Canada. This means that the process of allocating natural resources or laying claim to land titles often must be a tri-partite process in which the indigenous communities sit at the negotiating table and are empowered to make decisions which help shape the projects. They therefore exercise “citizen power” which involves various forms of “partnership,” and some forms of “delegated power,” such as the transportation of goods to the site. Finally, they may be allocated “citizen control” over certain stages of the project or areas of the resource for the use of their own people, as is indicated the Supreme Court decision in the Marshall case of the Mic’mac rights to the eel fishery in Nova Scotia (September 1999). The direction of the Supreme Court on these matters is toward the allocation of greater native voice in the allocation of natural resources.

Ultimately, the indigenous communities may assume full control over some territories or natural resources. Recently, the Nisga’a band in Northern BC, has been granted a land claim which fully recognizes its territorial claim. By virtue of granting their claim, their distinctive rights as natives have been extinguished but they gain control over all the lands and natural resources in their historic territory. This claim was approved by Parliament in October 1999, and the legislation supporting the claim was approved in December 1999. Many land claims are either currently before the courts or in process. It is likely that many will be recognized as legitimate. This will have important consequences for the bands involved and the larger non-native community. The establishment of Nunavut as a self-governing territory in the Eastern Arctic is also a step in this direction. There are a number of ways in which Indigenous Peoples can obtain larger shares of the economic benefits from mine projects. If the Indigenous peoples are the owners of the resources, i.e. if their ownership of territory has never been “extinguished,” they can claim the royalties which otherwise would have gone to provincial governments. For Nunavut, the initial Land Claims Agreement recognized Inuit-owned lands, with the remainder in the jurisdiction of Nunavut itself. In time, Nunavut presumably can impose its own corporate

income tax as well. If there are not accepted ownership rights, local indigenous communities might be able to impose property taxes, if the mine site is within town or regional limits. Another possibility is to have funds from a mine invested in a community-owned and controlled Endowment or Foundation.

Second, Indigenous Peoples can negotiate contractual obligations on the part of the mine enterprise to employ them. If they were not already trained for such employment, the enterprise could make commitments to establish the necessary training programs. Third, local communities could try to obtain the assurance that the mine enterprise would source some purchases of inputs for mining activities or for consumption by the mine-workers in the local indigenous economy. If there were little relevant business experience, the community could establish an organization to promote small businesses with support from the mining enterprise, or the territorial and federal governments.

There are two mechanisms in operation in Canada now, which try to ensure a fair and equitable distribution of the net benefits from mine enterprises. The first of these involves the mislabeled “comprehensive environmental reports,” prepared by the Canadian Environmental Assessment Agency, of the sort discussed below in the sections on the Diavik and Voisey’s Bay projects. In practice, these reports also devote much attention to the social and economic impacts of projects as well as to environmental concerns. The procedure for constructing these reports is outlined in the Diavik and Voisey’s Bay case studies.

The second key mechanism is the so-called “Impact and Benefit Agreement” or “socio-economic agreements,” which the company must negotiate with the indigenous communities. These agreements include many of the same items included in the comprehensive environmental agreements regarding economic issues. One important aspect of the agreements is that their conclusion may or may not be necessary prior to the start-up of a mine. If such an agreement must be reached prior to start-up, the most recalcitrant negotiator can effectively block the project even though everyone else has reached agreement. This may produce long delays, unfair treatment of different groups or it may even kill a project. On the other hand, if it is not necessary to reach an acceptable negotiated agreement prior to start-up, the enterprise may be in a strong position to ignore the concerns or demands of some of the partners.

### **C. Long-Distance Commuting, or “Fly-In / Fly-Out Mining”**

In the last two decades, there have been virtually no new mining communities constructed to accompany new mine projects in Canada. Every new project has involved transporting or flying the workers into the mine site for shifts of varying periods. This arrangement is referred to as “long distance commuting,” or “fly-in mining” (Shrimpton and Storey, p.190).

Long distance commuting avoids many of the difficulties of single-sector mining towns: First, the cost of constructing accommodations of a barracks/hotel nature is low compared to that of a full community. Such accommodation is not considered “home” so that the range of services required is also smaller than a full dedicated mine community. Moreover schools and family facilities are unnecessary. Second, the risk of major loss of the investment in the community for the enterprise and the public sector should the mine fail prematurely is also avoided. Third, the mining company has greater flexibility in deployment of workers over the course of the mineral market cycle. Indeed the workers and their spouses may have greater opportunity to find full or part time employment when they are located in a larger town or city rather than dwelling permanently in the mining town. Fourth, the human and economic costs of community closure, which would accompany a mine shut-down are avoided by long distance commuting. Fifth, because this arrangement seems to be reasonably satisfactory to the workers, job turnover and perhaps absenteeism are lower for the long distance commuting option as well (Ibid., p.195).

There are a variety of consequences of this pattern of mining for the development of local communities and regions as well as for families. On the positive side, the long distance commuting option provides employment for workers from older established mining towns, thereby helping maintain such communities. On the negative side, employment opportunities may be lost to residents of communities somewhat closer to the mine site. Furthermore, the stimuli to small businesses provided by the consumer demand on the part of the mine workers may migrate to the towns of origin of the commuting miners. This may be desirable or undesirable depending on the circumstances.

It is likely that mining will continue to move further and further into the northern areas of most Provinces, Labrador, Nunavut and the Western Arctic. Indeed, because of the occurrences of diamonds, a growing mining boom in Nunavut and the Western Arctic looks increasingly possible. As this occurs, fly-in mining may be of increasing benefit to northern communities and to the indigenous peoples of the North. Established indigenous communities could serve as the major labour sources for the future mines in these areas. Workers would commute from their communities to the dispersed mine sites. A number of factors are in place to make this happen:

- All of the communities are now equipped with air transport facilities.
- There is an obvious locational advantage for commuting within the region.
- There are indigenously owned airlines serving the region.
- The new types of “Impact and Benefit Agreements” stipulate that large and growing proportions of the employment opportunities must go to the First Nations and Inuit peoples.

### **3. The Voisey's Bay Nickel Project: Can Harmony and Equity Be Negotiated Prior to Start-Up?**

The Voisey's Bay nickel project, one of the largest mining projects in Canada in the post-war period, is of special interest because a variety of major issues have emerged in the relationships between the mine enterprise, the Aboriginal Peoples of the area, and various levels of government. This project may generate large and much-needed benefits for the Innu and the Inuit of the area, for Labrador, and Newfoundland, as well as for the International Nickel Company of Canada (INCO.) To ensure that there is an equitable and viable sharing of benefits, a process of negotiation has been undertaken between the Aboriginal Peoples, the enterprise, and offices of the federal and provincial governments. An important part of this is the Environmental Assessment Report produced by the Canadian Environmental Assessment Agency, designed to evaluate the environmental effects of the project proposal, to undertake public hearings for the evaluation, and to recommend changes to the proposal. This assessment also includes an analysis and evaluation of the economic and social consequences of the project. A more detailed "Impact and Benefit Agreement between the company and the Innu and Inuit remains to be negotiated, however. On this basis, the Government of Canada in consultation with the other parties gave the project a "go-ahead" from an environmental standpoint, on August 3, 1999.

#### **A. The Context**

In 1994, two geologists were searching for diamonds for Diamond Fields Resources Inc., but ended up discovering the Voisey Bay nickel deposit. In August 1996, the site was acquired by the International Nickel Company of Canada for \$US 3 billion. A separate enterprise, Voisey's Bay Nickel Company (VBNC,) was spun off for the project. Delineation drilling indicated a resource of about 32 million tonnes with grades of 2.83% nickel, 1.68% copper, and 0.12% cobalt in 1997. It is relatively close to the surface and about 10 kilometres from the ocean. Some \$US 55 million had been invested in exploration by mid-1999 (INCO, 1999).

The VBNC is planning to begin mining the shallow "ovoid" or egg-shaped ore body with an open pit mine accessing 32 million tonnes of ore, and later, an underground mine accessing an estimated 118 million tonnes. It would employ about 420 persons in the open pit phase and perhaps 950 in the underground phase. The ore would be converted into a concentrate at the mine site and shipped to a nearby ocean port for transport to the smelter and refinery, either in Sudbury Ontario or possibly in Newfoundland.

The main environmental impact of the mine would be the finely ground solid tailings remaining after the concentration process, and some waste rock. They were to be

“stored under water in two tailings basins made from existing lakes... to prevent .... them from being in contact with both air and water simultaneously which would cause them to release acid” (Canadian Environmental Assessment Agency Panel, 1999).

The Voisey’s Bay mine site is in a general area claimed by the Inuit and also the Innu Peoples. The Inuit, numbering about 5000 persons, occupy the areas to the north, with a community at Nain, about 35 kilometres from Voisey’s Bay. The Innu, numbering about 1500 are centred at Utshimassits or Davis Inlet, some 80 kilometres south of Voisey’s Bay. They have occupied the general region of Northern Labrador and parts of Northern Quebec.

The lands were never ceded by the Innu to any other government. In the words of Peter Penashue, President of the Innu Nation:

“Innu have never recognized the jurisdictions that now claim us. We have never signed a treaty, nor ceded a square inch of our land. In the past these things were not necessary, as it was possible for Innu and Akenishau people to share the land and its resources..” (Penashue, 1995.)

Land Claims negotiations with the Federal Government have been underway for some time and are not close to completion as of early 2000.

The Innu and Inuit have limited economic opportunities in the absence of the mine. Incomes are low. Unemployment is high. Social and health problems are particularly serious. Population growth rates are also high. Economic self-reliance has been increasingly difficult given population growth and the limitations of traditional economic activities. At present, there is little generation of community financial resources, causing a continuing financial dependence on the higher levels of government. In this context, the prospects of new economic activities generating jobs, personal incomes, tax revenues, and community self-financing of social expenditures are economically, socially, and politically attractive.

Mineral development is a Provincial responsibility, so that the Government of Newfoundland and Labrador is involved as well. Because previous resource agreements negotiated by Newfoundland in the past have proven to be unfavourable, the Provincial Government has been anxious to defend its interests in the Voisey’s Bay project negotiations as effectively as possible. As part of its negotiation process, it passed legislation requiring that all minerals extracted in the province also must be smelted and refined in Newfoundland as well. On the other hand, INCO argued that the forced location of the smelting and refining in the Province was economically unviable. The Provincial Government did not change its position and

insisted that the processing occur in the Province or else the project would not proceed. Unwilling to make an investment considered unviable, INCO proposed an alternative hydrometallurgical process which was cheaper but also unproven for the types of sulphide ores of the Voisey's Bay mine, with the option of dropping the approach if it proved unviable. Premier Tobin also refused to budge. The negotiations then broke down and INCO ceased further investment in its exploration program.

There are a number of risks arising from this impasse. There is no guarantee that the hydro-metallurgical process will in fact work. If it does not, all parties will lose immeasurably if the company is pressured to try. Another risk is that other nickel projects elsewhere in the world come on stream, forcing nickel prices lower, and perhaps delaying Voisey's Bay for many years and conceivably permanently. The loss for the Innu and Inuit would be devastating in the long-run as they would lose their advantage in the future development of mining in the Canadian North.

#### **B. The Environmental (and Community Benefits) Review**

An Environmental Review was begun by the Canadian Environmental Assessment Agency in January 1997, with INCO, the Provincial and Federal Government and the Aboriginal organizations participating and was completed in November 1999. The Environmental Assessment Panel Report included a community benefits analysis.

The Panel conducted hearings in Labrador and Newfoundland and consulted with the Aboriginal organizations and with the Company. It sought and obtained detailed information concerning VBNC's Mining plan, its proposed methods for managing the anticipated environmental problems, as well as the social and economic benefits for the local communities. It examined issues of air quality, shipping and its impacts on aquatic life, tailings management, freshwater fish and habitat, seals whales and polar bears, birds, Caribou and black bears, and general contaminants. It explored the impacts of the mine operation on the traditional economy of the Innu and Inuit, including the disturbance of wildlife, loss of habitat for animals traditionally hunted, contamination of country foods, disruption of travel across, and reduced access to traditionally-utilized resources. The Panel also focused on economic concerns such as employment, the effects on local business, training, families and communities. A number of additional issues were also addressed, namely the size and viability of the relevant ore bodies,

the expected mine-life, and the rate of ore extraction, these being the key determinants of the sustainability of the benefits which would flow from the mine. Its Report was made public on April 1, 1999.

The Panel recommended that the project proceed. However this was subject to the terms and conditions spelled out in a large number of specific recommendations. The Panel concluded that:

“... the Project could contribute significantly to sustainable social and economic development on the North Coast and in the rest of Labrador, without harming vital ecosystem functions and habitats or the ability of Inuit and Innu to keep using the lands in traditional ways.” (CEEA, 1999.)

The rest of the document delineated the conditions that would have to be fulfilled by the Company if it was to proceed with the project.

While negotiations between the Company and the Innu Nation and the Labrador Inuit Association on a formal “Impact and Benefit Agreement” had not been completed by early 2000,

the Panel set out numerous recommendations designed to assure that the economic benefits for the Aboriginal communities are significant and sustained. The Panel recognized that when the title to the land is held by Aboriginal peoples, Governments must ensure that, if Projects such as this take place, the Aboriginal peoples must receive fair compensation, be properly consulted, and participate in the resource development. The Panel argued that these could best be assured if the Land Claims issue were settled. However, because numerous other factors influence these negotiations, it would not be wise to halt the project until such time as a settlement was reached. Interim measures were therefore necessary.

The compensation and participation dimensions would be incorporated in the Impact and Benefits Agreement being negotiated between the Innu Nation, the Labrador Inuit Association and VBNC. The Panel recommended that reaching this agreement be a precondition for the implementation of the project.

In its submission to the Panel, the VBNC prepared an Economic Impact Study (EIS) outlining the economic benefits that would flow to the people of the region. These were queried by the Panel, further elaborated by the Company and then became the focus of some of the Panel’s recommendations.

The VBNC agreed to give first preference to members of LIA and the Innu Nation, second to citizens of the rest of Labrador, and then to Newfoundlanders. It estimated that 29% of the total number of jobs in the open-pit phase of the mine would go to Innu and Inuit, with 21% of the total in the technically more complex underground phase of the mining. The VBNC and

the Innu Nation also put forward some of the features of the Impact and Benefit Agreement which they were in the process of negotiating. These included education and training, quantified employment objectives, measures to ensure that the lack of formal education requirements not be a barrier to employment, the hiring of an Innu Employment co-ordinator, a workplace respectful of traditional Innu values, and an anti-discrimination program. The Inuit had similar concerns but had not yet reached a preliminary level of agreement on the design of their Impact and Benefit Agreement (IBA) with VBNC.

Responding to some of the concerns raised at the Hearings, the Panel recommended that additional measures were necessary to overcome some of the barriers to such employment faced by the peoples of the region, and to help with the adjustments which such employment would require. Among the recommendations were:

- “Improving the existing ‘Multi-Party Training Program’ to increase access to training for Aboriginal People and for Women;
  - Implementing a second chance policy for employees who run into difficulties adjusting to their jobs;
  - Setting up anti-racism and cross-cultural programs;
  - Designating Cartwright as a pick-up point for employees (to facilitate access to mine employment for inhabitants of the south coast of Labrador);
  - Establishing a process to ensure that women’s concerns and perspectives are built into all decision-making in the workplace;
  - Implementing measures to improve child-care services in the home community.”
- (CEAA, pp.10-11)

In its Economic Impact Statement, the VBNC estimated the effects of its activities for the businesses of the area, for Labrador and the Province. It estimated that Labrador and Newfoundland businesses would capture 16% of the expenditures on goods and services. Labrador firms would supply nearly 43% of the purchases made within the Province, amounting to \$US 1.4 billion. It also estimated that indirect employment would generate incomes of \$US 1 billion for the whole of Newfoundland and Labrador, \$US 296 million for Labrador alone, and \$US 50 million for the Northern part of Labrador. According to an “Industrial Benefits Monitoring Plan” in operation at this time, \$US 37.5 million of a total \$US 86 million spent in the Province has gone to Labrador.

To improve the capability of Labrador and especially Northern Labrador to increase their capture of the input purchases of the mine, the Panel recommended that the VBNC, in consultation with the Aboriginal and Labrador Businesses, and the Federal and Provincial Governments, “... establish a comprehensive supplier development strategy .... to make it easier for local suppliers to put in competitive bids” (CEAA, Chapter 15, pp.11-16). This would include supplier development initiatives, objectives for Aboriginal and Labrador procurement,

and clarified procurement procedures. All of this should be in harmony with the still-to-be negotiated IBAs.

The mine is to be fly in - fly out operation. This means that while a type of barracks/hotel will be constructed adjacent to the mine site, most employees will commute from their respective communities. (Nain, 35 kms. to the north, is accessible by aircraft, boat or snow vehicle, depending on the season.) This means that benefits should flow to the communities without the influx of large numbers of new inhabitants. Nain and Davis Inlet would provide significant amounts of labour, and would likely experience increased housing, commercial and community construction, and an expansion of business activity.

The Panel foresaw major disruption to the town of Nain and called for a variety of specific measures to facilitate its adjustment. Perhaps most significant, it recommended that the VBNC pay the community to cover some of the additional costs imposed by the mine, for the use of community facilities and infrastructure by the VBMC during the construction. This is appropriate especially as the mine site is outside of Nain's current jurisdiction, and would have difficulty imposing property taxes on the mine (CEAA, Chap.16, pp.12-16).

Compensation payment in the form of a royalty will also be made to the Labrador Inuit Association, but the detail of this is included in the IBA and is not yet known. In any case, there is no guarantee in any case that the LIA would support Nain appropriately. An independent taxation type of payment for Nain is probably unavoidable. Further recommendations were made regarding the development of transportation infrastructure, health facilities, and community economic development. Only when the Impact and Benefit Agreement is made public will we know of the full agreement reached between the Innu and Inuit and the Company.

One hopes that the Indigenous Communities will have been able to obtain a fair share of the economic benefits from the VBNC, and that simultaneously, the mine remains commercially viable. If the sharing is reasonable and equitable for the Innu, for the Inuit and also for Labrador generally, a major break-through in mine-community relations will have been achieved. We should have a good idea of this in the next few years.

Much of the Panel's Report was devoted to environmental issues. A large majority of the recommendations dealt with the details of the environmental effects of the project. Of critical concern was the issue of managing the solid tailings from the mill operation so as to prevent acid generation and leakage. Various alternative arrangements were considered, and the Panel proposed that the possibility of "back-filling" the open pit cavity with tailings be explored.

#### **4. Diamonds in the Northwest Territories: The Diavik Mine**

The development of diamond mining in Canada's Northwest Territories is opening a new chapter in Canadian mineral development and perhaps in the relationships between the mining enterprises and the Indigenous Peoples. The vast endowment of diamond occurrences only became clear with the extensive exploration that took place in the decade of the 1990s. One mine, Ekati, is in production, a second, Diavik, is in the construction phase, while others are in the assessment stage. The mines provide a major opportunity for the indigenous communities in the areas. It is important that the first agreements between the companies and the communities are equitable and fair.

#### **A. The Context: Diamond Mining Development in the North**

In 1991, diamond-bearing kimberlites were discovered in the Lac de Gras region in the Northwest Territories, sparking an exploration rush of epic magnitude, especially in the Northwest Territories. Approximately \$US 510 million was invested in exploration from 1989 to 1998 (Canadian Intergovernmental Working Group, 1998, p.25). Numerous kimberlites were discovered, including over 100 on the Ekati property, around 50 on the Diavik area, and many others at sites in the North. The ore grades are of some are of internationally competitive quality. The first mine to come into production was Ekati, a joint venture between Dia Met of Kelowna, B.C. (the Canadian partner--29 percent), Broken Hill Properties of Australia (BHP--51 percent), and the two geologists who discovered the ore-body,

The second mine site is that of Diavik Diamond Corporation Ltd, 60 percent owned by Rio Tinto PLC of Britain and 40 percent by the Canadian partner Aber Diamond Mines of Vancouver. The mine is located on an island in Lac de Gras, which is about 200 kms. south of the Arctic Circle. It is estimated that some 104 million carats of the identified diamond resource are of minable quality (Canadian Intergovernmental Working Group, 1998, p.29). The mine is to include four kimberlite "pipes" on, or adjacent to, the island in Lac de Gras. Diavik proposes to construct dykes around three of the pipes, which lie in 12 and 26 metres of water. The areas inside the dykes would be drained thereby permitting open-pit mining in the pipes, reaching depths of about 300 metres. Subsequently, underground mining would be initiated at two of the pipes, reaching depths of 400 metres. Underground mining would be more expensive but would extend the mine's life by six years. This mine is scheduled to come on stream in 2003. It is estimated that \$US 884 million will be spent by the partners in the development of the mine site (P. Kennedy). The estimated mine life is 16 to 22 years. However, intense exploration is continuing in the region, and it would be surprising if additional economically viable pipes were not located and "proved up" thereby extending the life of the mine activity significantly. The diamonds will be extracted from the ores in a conventional diamond recovery plant.

Four groups of First Nations peoples have traditionally used the territories in the region of the Diavik mine site: the Yellowknife Dene First Nation (YDFN), the Lulsel K'e Dene First Nation (LKDFN), the North Slave Metis Alliance (NSMA), and the Kitikmeot Inuit Association (KIA). The Diavik mine lies within the traditional and proposed settlement areas of the Treaty 11 Dogrib, the Akaitcho Territory Dene, and the NSMA. Land settlement negotiations or pre-negotiations have been underway for some time. All of these groups are participating in the negotiations with Diavik and other relevant organizations. All expect to reach formal Impact and Benefit Agreements with the company as well.

The social and economic situation of the Indigenous Peoples is generally viewed as inadequate. Unemployment has been high, in the area of 20%. Incomes are relatively low. Reliance on welfare is significant. The tax base of the communities is weak. The communities continue in a quite dependent relationship with the Department of Indian Affairs and Northern Development. Traditional economic activities continue but do not provide sufficient incomes for many people.

### **B. The “Comprehensive Study Report”**

The Canadian Environmental Assessment Act required that Diavik undertake a comprehensive study of the impact of the mine on the environment of the area as well as on the socio-economic well-being of the people in the region. Diavik's report was based on geo-technical, environmental, socio-economic research, as well as public consultation and discussions, which took place between 1994 and 1998. The Canadian Environmental Assessment Agency, in turn, received the report, undertook further consultations with the Aboriginal Associations, the Territorial Government, and the Federal Agencies responsible for the project, (namely the Departments of Indian Affairs and Northern Development, Natural Resources, and Fisheries and Oceans). It presented its Comprehensive Study Report to the public in June 1999. After some time for public debate of the project, the Federal Government announced that the project would not have to proceed to a more extensive public panel study. On November 4 1999, the Federal Minister of the Environment, David Anderson, announced that the project could proceed to development. This would enable the Company to begin construction this winter Season as the winter road to the site is open only January to March. But further delays in obtaining environmental permits may have postponed the mine opening to 2004 (Shuster, p.1.)

In its Report, the Canadian Environmental Assessment Agency summarized the position taken by Diavik in its submission to the Agency, presented the critiques of the Aboriginal Organizations, of the Responsible (Federal) Agencies or “RAs,” and of the Governments of the Northwest Territories and Nunavut, and then presented its own recommendations. No formal

Impact and Benefit Agreements between Diavik and the Aboriginal organizations had been reached by the beginning of 2000. Many of the expected effects were spelled out by Diavik and included in the CEAA Report. These are outlined below:

Employment:

Construction Phase, 2000 to 2001:

Total Work Force: 600-800 per year on average.  
 Employment for Northerners: about 280 per year on average.

Operations Phase, 2002 to about 2020:

Total Work Force: 411 jobs per year.  
 Annual Northern Work Force: 66% or 271 at first, rising later to 100% of employment later.  
 Aboriginal Employment: 40% or 164

Wage Payments:

Construction Phase, total: \$US 104.7 million  
 Operations Phase, per annum  
 Total: \$US 20.5 million.  
 Northern Employees: \$US 13.6 million.

Purchases of Goods and Services from the North:

Construction Phase: 2000 to 2001:

Total Capital Cost: \$US 884 million

Operations Phase: 2002 onwards:

Average Total Annual Cost of Inputs: \$US 61.2 million.  
 Average Purchases from the NWT Businesses: \$US 19.0 million.

Tax Payments

Construction Phase, Total:

Federal Government: \$US 28.6 million.  
 Territorial Governments: \$US 10.9 million.

Operations Phase:

Federal Government: \$US 4.1 million per year.  
 Territorial Governments: \$US 1.2 million per year.

The policy of Diavik is to increase employment of Northerners, including First Nations peoples, to 100% of the total, with first priority in hiring accorded to aboriginal people from the near-by communities, and second priority to people from other Inuit, Dene and Metis communities. Diavik also committed itself to buy as much from the North as possible (CEAA Report, p.200.) It also proposed to undertake special training programs for the local labour force, to support business development activities, to increase business capacities in the area, to communicate procurement needs clearly, to support the local businesses in obtaining of commercial credits, and to design and communicate business strategies for affected groups. It also proposed a business development tracking system.

Diavik also discussed cultural impacts and well-being, the social impacts on communities, training programs, and opportunities for women.

The NWT Government and Indigenous Associations made a variety of critiques and additional proposals. The Indigenous groups emphasized the following:

- The need for a “Value Added” agreement with Diavik to ensure that significant economic spin-offs to the area occur;
- Special mitigation efforts and measures to deal with maintaining cultural well-being, overcoming sociological barriers to employment;
- Ensuring fair access to employment opportunities for women, and problems of “fly-in / fly-out” rotation systems.

An important recommendation accepted in the Report was for the establishment of a formal “Socio-Economic Monitoring Agreement” to be implemented by the mine, the relevant Indigenous organizations, and the Territorial Governments. This mechanism, among other things, would identify objectives, design mitigation and monitoring programs, specify the responsibilities of the various parties for finance, implementation and final decision-making, resolve disputes, and involve public participation.

One problem with the social and economic issues area is that the mine enterprises negotiate the “Impact and Benefit Agreements” individually with each Indigenous organization or community. This could weaken the Indigenous organizations’ bargaining strength. These negotiated agreements cover such things as job opportunities, training, and preferential hiring programs; financial transfer payments, royalties, and equity participation; new business development and contractual arrangements; and compensation for declines in harvests of wildlife and fish. Many of these agreements are not in the public domain and therefore cannot be closely scrutinized. The character and fairness of the agreements probably depends upon the capabilities of the aboriginal negotiators and the quality of information at their disposal. It has been argued that the Companies should be forced to sign impact and benefit agreements with a consolidated group of all impacted aboriginal communities, rather than with one community at a time with widely varying access to knowledge. This appeared to critics as a “divide and conquer” strategy on the part of the mine enterprises (Keith, 1999).

The asymmetry of information between the enterprises and the Indigenous Organizations may be a serious obstacle in the construction of fair Agreements between the bargaining parties. Indigenous groups and communities have had little opportunity in the past to acquire relevant geological, technical, commercial, and organizational information. Moreover, these groups and communities usually will be inexperienced at undertaking such negotiations. In contrast, the companies have the technical knowledge as well as the bargaining expertise. They will have employees to conduct the negotiations and who are experienced in the arts of negotiation and who have access to all the relevant information available on the project.

To remedy this asymmetry, it is vital that publicly financed support be made available to those Indigenous Organizations and communities beginning negotiations with mine enterprises regarding “Impact and Benefit Agreements.” Such assistance could be provided by staff of relevant NGOs, such as the Canadian Arctic Resources Committee (CARC), by consultants in mineral development, negotiation techniques, financial analysts etc., or perhaps by specialized personnel from Territorial Governments or the Federal Government.

The CEAA’s *Comprehensive Study Report: Diavik Diamonds Project* attempted to include a comprehensive range of environmental issues. It included possible impacts on air quality, global climate change, vegetation and terrain, wildlife of all varieties in the areas, biodiversity, water quality, fish, and the impacts of the environment on the project itself, and finally, the possibility of accidents and malfunctions of various sorts and the impacts these could have.

The Comprehensive Report concluded that the Diavik Mine would have:

- (a) No significant adverse effect on air quality provided that the required mitigation measures are applied;
- (b) No significant contribution to national or global air particulate emissions;
- (c) No significant adverse effects on vegetation or biodiversity on a regional scale;
- (d) No significant effects on the Bathurst Caribou herd, grizzly bears, or other carnivores, raptors, waterfowl, small game, or on the biodiversity of the area.
- (e)

However, in some cases, mitigation measures were prescribed, and a follow-up program was proposed to monitor the possible effects. The Report considered that Diavik had adequately addressed the environmental requirements related to hydrology and surface water quality, surface water runoff, dike construction and sediment management, as well as the isolation of the North Inlet and the effluent discharge. However, again, monitoring and follow-up mitigation programs were required in some cases. It was also concluded that the project would have negligible impact upon groundwater quality, but a follow-up monitoring program was also proposed with mitigation measures if necessary.

Diavik agreed to the various follow-up programs and monitoring of a number of areas such as ambient air quality, wildlife numbers, water quality, fish and fish habitat, as well as a number of socio-economic measures of health, heritage resources, and traditional fisheries and, finally, checks for cumulative effects.

The review process has been criticized on a number of grounds. First, the Company had four years to prepare its environmental assessment submission. The Department of the Environment and other interested Departments had from September 1998 to June 1999, to study the submission, undertake consultations, undertake their own analysis and research, and prepare

their Comprehensive Report. The Canadian Arctic Resources Committee (CARC) has argued that the time was insufficient to enable all the affected voices to be effectively heard (CARC. 1999, p. 1). It should be noted that both CARC and the Dogrib Nation had refused to participate in the final phases of the environmental evaluation. (Zoe, November 2 1999: A17).

CARC (1999) also argued that the process is flawed because the various projects in the region are considered only case by case, without an analysis of the cumulative and long-term effects of infrastructural construction and development on the region as a whole. With more mining projects on the horizon, with a major pipeline project in the works, and with the probability that transportation infrastructure and perhaps electrical energy infrastructure will be introduced to service the mining and pipeline activities, their aggregated environmental effects may well be significant, even though each individual project's impacts may be small or subject to mitigation.

The major environmental risks in the project appear to be the "tailings mountains" which will be build up over the life of the mine as the open pit is excavated. This could result in the leaching of heavy metals such as cadmium into the lake and the Coppermine River system, with harmful effects of animals and fish as well as human health. Accidents could also occur with serious damages to the environment. In view of these possibilities, there is discussion regarding a requirement for the company to contribute up to \$US 120 million over time to manage possible environmental problems and to undertake long-term stewardship over the mine site after decommissioning. The company apparently has proposed a fund of \$46 million (Globe and Mail, January 6, 2000). In either case, this is an interesting and important precedent.

Perhaps all mines should establish such environmental funds or endowments in order to cover the costs of environmental damage and care after the mine has shut down. In economists terms, this would "internalize the negative externalities" that at other times were shifted to local communities, citizens, taxpayers, and governments. This would avoid the traditional but still common pattern of the mine enterprise walking away after the shutdown of the mine, leaving the rest of society to manage the environmental problems they created.

## **5. A Mature Mine in an Established Region: Potash Mining in New Brunswick<sup>1</sup>**

The mining of potash (with a salt co-product) near Sussex, New Brunswick commenced in 1983. It is an example of a mature well established mine in an already populated area. It has

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<sup>1</sup> This section draws on field-work undertaken by Professor Allan Steeves, Sociology, Carleton University in 1987-1988 and again in 1999. The papers prepared by A.Steeves on the potash enterprise and the community in New Brunswick are listed with the references.

had a variety of positive economic and social impacts on the immediate communities and the adjacent areas, with few significant negative effects. Indeed, it is difficult to imagine a mine with more positive net impacts for the local communities.

### **A. The Context: Potash Mining in New Brunswick**

In January 1971, occurrences of potash were discovered at a site in Plumweseep, near Sussex New Brunswick. Mine construction was completed in 1980, with the first shipment of potash in 1984. The mine was subsequently transferred from the Potash Corporation of America to Rio Algom of Toronto, and subsequently in 1993 to the Potash Corporation of Saskatchewan (PCS.)

The potash deposits are located at a rather shallow level - 400 to 700 metres depth - and take the form of layers, originally horizontal but now up-thrust towards the vertical. The mineral extraction is done by continuous mining machines, in “cut-and-fill stopes,” with the ore extracted via step-by-step cutting out of successive layers. This is important to note, because the tailings are then returned to the mine and serve as the new floors for subsequent extraction in an “integrated closed-loop system.” Rock salt is also extracted in a different part of the mine using a “room-and-pillar” method. The ore is then treated in the surface refinery and the potash converted to pellets of various sizes ready for use as fertilizers. This mine has a capacity of 780,000 tonnes per year for potash, and about 650,000 for rock salt.

There are probable potash reserves of 25 years at current mining rates (R. Gauthier, Interview, July 1999) although possible reserves may last much longer. There is a current problem with water seepage into the mine. To control the seepage requires continuous and expensive action, and raises mine costs. If the problem were to escalate severely, the costs of extraction might become excessive and the mine might shut down well before the exhaustion of high-quality reserves.

Some 344 persons are employed at the mine, underground, in the refinery, the administration and ancillary activities ([www.potashcorp.com](http://www.potashcorp.com).) The employees of the mine operation are drawn from adjacent communities. No special “company town,” no new town site and no special barracks are necessary, as the employees continue to live in existing communities or near-by rural areas. The employees commute to the mine using their own means of transportation.

By coincidence, the mine is located about 100 metres from the Trans-Canada Highway, and is close to a main rail line. These facilitate the transport of people, finished products, inputs and equipment. The original infrastructure costs and the continuing operational costs have been reduced significantly by the ease with which the mine was able to settle into the established communities and the region, as well as the existence of the national transport grid so close to the

mine-site. Moreover, access to convenient rail transport provides low-cost transportation to the Port of Saint John and thence competitive access to potash markets in the Atlantic area of the Western Hemisphere and Europe.

A second potash mine-site, located about 20 kilometres south-west of Sussex at Cassidy Lake, was opened for intensive exploration in 1979, and a mine was constructed and in operation by 1985, with Denison Mines of Toronto as the owner. The mine faced flooding problems and was shut down in 1997. This property was also acquired by PCS in 1998. The refinery at this site is currently used to upgrade standard potash ore transported from Saskatchewan. The refinery employs about 30 persons.

The Potash Corporation of Saskatchewan is a large integrated fertilizer producer initially established as a Provincial enterprise by the Saskatchewan Government in 1975. It expanded rapidly during the 1980s and became one of the largest potash producers in the world. In 1993 PCS was privatized and since this time it has diversified by acquiring large phosphorous and nitrogen producers with the acquisition of Texasgulf in early 1995 and Arcadian Corporation in 1997. PCS is now the largest integrated enterprise producing the three fertilizer components in the world.

Historically, the population of the Sussex area relied primarily on farming, logging and pulp-wood industry. Since World War II, employment in these has declined due to mechanization. Small farm operators have been leaving agriculture in the area during the past 50 years. As a result of the decline in these industries, the economy of the region was quite stagnant outside Sussex and St. John. Thus it was with relief and optimism that the provincial officials and the local population welcomed the potash industry and the prospect of jobs for local workers at the beginning of the 1980s. Both mines promised, where possible, to hire and train local personnel for work at the mines both underground and in the mill phases of the operation. This has been rigorously implemented.

### **B. Economic, Social and Environmental on the Local Communities<sup>2</sup>**

The most important direct economic impact of the mine enterprise in the region is the employment and the income it generates. As noted, the two mine operations employ some 374 persons, and generates about \$US 18.5 million per year in income payments at wage rates well above the average for the area (author's estimate). Besides the direct wage and income payments, the mine also acquired a substantial proportion of its inputs locally. A large proportion

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<sup>2</sup> Unfortunately detailed financial information on the potash mine in New Brunswick is not available because the accounts of the Potash Corporation of Saskatchewan are consolidated for their entire international operations. The detailed information for the Sussex mine were not provided by the company.

of the direct purchases of the mine in the region for supplies, services and energy - about 48.6% of total costs - were spent in the region. All of the electricity is provided by the provincial electrical utility. The company estimated that 52.6% of all purchases of supplies and services (excluding fuels and electricity) is purchased from New Brunswick. This would include such things as contract labour e.g. tradesmen, truck and auto parts, and some basic types of machinery and equipment. A variety of new industries that supply the mines were established in the area, especially in Sussex (Steeves, 1988). A major trucking cooperative, Kingsco Transport, has also been a beneficiary. Thus the economic base of Sussex has broadened somewhat with light manufacturing and supply and distribution businesses.

It was estimated crudely, by PCS, that on average, about 3 to 4% of purchases of supplies and services were from outside of Canada. However, this may not provide an accurate idea of domestic Canadian Value Added relative to foreign Value Added, because a large, though unknown, proportion of the items purchased domestically would have been purchased from abroad or else would contain imported inputs. No taxes were paid directly to the local communities, though the employees paid property taxes in their communities. A significant but unknown proportion of the profits of the whole PCS enterprise in Canada would also be paid to the Federal and Provincial Governments in the form of Corporate Income Tax. Employees also paid personal income taxes to the higher levels of government. An undisclosed amount of royalties were also paid to the Provincial Government.

The entry of mining into the Sussex region had a variety of impacts of a social character. The first impact of course is the greater security of livelihood for individuals, their families and their communities as a result of the incomes generated from the mines. This social impact is of obvious importance and should not be forgotten.

Second, the entry of potash mining into the social settings of King's County has generated a number of changes in communal dynamics. The mining enterprises introduced relatively high rates of pay, recruitment policies based upon achievement and formal training, a work setting of an "industrial" character (including shift work,) and a global rather than a local or regional enterprise orientation. This meant that the "mining community" was quite distinct from the local community. The mining enterprises wisely recruited qualified local personnel as much as possible.

Another feature of potash mining in Kings County was the large size of the operations, relative to the scale of earlier economic activity. Moreover, they were also continuous process operations, working 24 hours, seven days a week. The mines therefore required "shift work" for both their mine and mill employees. This had a number of implications for the community. It meant that other agendas had to be altered to accommodate the loss of weekends and evenings at home. It also had the effect of isolating the miners from community activity, which up to this

point had been organized to take place either in the evenings or during the weekend. However, the shift-work arrangement also has some attractions. At the PCS mine, the bulk of the production personnel work four 12-hour days on and then take four days off with rotations on day and night shifts. Workers preferred this shift arrangement because during the "four days off" they are able to engage in other activities such as farming, logging, mechanical work, or auto body repair enterprises (Steeves, Interviews, 1988.)

Third, judging from the views of many of the miners themselves, they had little difficulty adapting to mine production even where it involved underground work. The personnel managers considered that the local personnel had excellent mechanical and electrical skills, and proved to be good mechanical operators.

Although one might think that the establishment of the potash mines might have contributed to a process of population concentration in small cities and towns in the area, in fact this has not occurred. Indeed, there has been a process of "ruralization" in operation as many miners and their families have chosen to locate outside the municipalities in the area thus becoming part of the rural non-farm population. In analysing the detailed population data for the region, Steeves (1988) found that the rural areas grew at twice the rate of the urban areas over the course of the decade 1976-1986, at 2.4% per year in comparison with 1.2% for the urban areas. Approximately 80 percent of the mine labour force lived in the unincorporated areas of the County, in their home communities (Steeves, Interviews, 8 October 1999).

The PCS Plumweseep mine has had a surprisingly small environmental impact. Indeed, it must be one of the more ecologically benign mine operations in the world. The reason for this is that the solid tailings and the liquid brine wastes remaining after the refining process are both put back into the mine. As a result, there is neither a tailings mountain beside the mine-site, nor a discharge of noxious brines into nearby rivers or tailings ponds. There is an aerial discharge of vapours and smoke but it is almost insignificant, judging by appearances. The inhabitants of the area seemed to show little concern for the discharge. It seems to have no negative consequences in terms of damage to plant life, to farming which continues up to the mine site gates and fences, or to tourism in the area. (There is a Bed and Breakfast lodging facility next to the mine.) There were no noticeable smells caused by the smoke or the refining process apparent outside the mine site.

## **6. Sudbury: The Emergence of a Mining Metropolis?**

Over the last 120 years, Sudbury Ontario has evolved from a frontier railway and mining town to a significant "mining metropolis" and an important regional economic centre in Northern Ontario. It has developed both a substantial degree of economic diversification around a

mineral-extraction base as well as a broad range of economic activities of a governmental, business service, health and educational character. It may now have reached a stage where it is as sustainable as a mining community could expect to be, given its dependence upon difficult and volatile international mineral markets.

What factors have permitted the emergence of a significant cluster of economic activities around mining converting Sudbury from a mine town to a large and complex regional centre servicing the mining industry. Can Sudbury become a centre for the global mining economy?

### **A. Historical Development of the Sudbury Mineral Economy and Region**

The Sudbury Basin is a unique geological formation measuring about 60 by 27 kilometres in an oval or elliptical shape. The foundation of the basin is about 10 kilometres deep. It is likely that the basin is the result of the impact of an asteroid that collided with the earth and caused a deep fracture in the earth's crust, permitting the magma or molten rock from deep inside the planet to rise to the surface. Nickel mineralization was detected by surveyors in 1856, but it was not until the construction of the transcontinental Canadian Pacific Railway in 1883 that an outcropping of copper was revealed in construction blasting and in the ballast used for the rail bed. This sparked a prospecting rush. In time, with the development of processing technologies for extraction and for separation of nickel from copper, both extraction and smelting expanded. By 1902, the International Nickel company of Canada, INCO, had been created from a merger of two earlier companies, and by 1918, INCO had become an integrated mining, smelting and refining firm, with a refinery in Port Colbourne (Saarinen).

Although Sudbury began as a Canadian Pacific Railways company town, the early development of mining then made it a significant mining community. During this period, the major mine enterprises operating in the area - INCO and Falconbridge - developed their own company towns at the mine-sites. Sudbury emerged as a type of fringe of settlement for the whole area. Its development was stunted, because most of the managerial and labour personnel from the mines lived in the company towns, while only those who were less integrated into the main mining economy settled in Sudbury. Moreover, the mine enterprises, unlike other industrial enterprises, did not pay local property taxes until after 1945. Even in 1945, the companies did not pay local taxes; instead, the Provincial Government provided a compensating revenue, though this amounted only to about one-half of the business revenues received in other non-mining communities (Saarinen, 167.) This lack of an effective tax base limited community action for urban development, infrastructure, and beautification. In this era, Sudbury was famous for its the nickel industry, but also infamous for the environmental destruction caused by the sulphur emissions from the metal smelters, which killed much of the vegetation. The area bore an uncanny resemblance to the lunar landscape.

After World War II Sudbury expanded as nickel demand grew in response to military and consumer demands. The population in the area increased from about 115,000 in 1951 to around 170,000 in 1971. This population expansion, based ultimately on mineral exports from the region, was caused and, in turn, contributed to, a continuing process of economic diversification mainly of business, educational, health, and government services. Of particular note was the establishment of Laurentian University in 1960, which began to play an important role in the intellectual life and, in time, the technological leadership in the region. The Sudbury economy was further strengthened with the development of mining in Elliot Lake, which fell within Sudbury's sphere of influence. The construction of a direct highway link with Southern Ontario via Parry Sound and Gravenhurst gave Sudbury a "gateway" location which allowed it to evolve as the major transportation centre of Northern Ontario, in competition with North Bay. Trans-Canada Airlines flights were introduced in 1952-54, further consolidating Sudbury's status as a central transportation node.

During the 1970s, the Sudbury economy went into a process of contraction caused mainly by reduced mining employment as a result of lower mineral prices. Paradoxically, the groundwork for a subsequent turnaround was also laid in this period. Competitive pressures on nickel production in the area led INCO and Falconbridge to rationalize their production and initiate major processes of technological improvement designed to lower production costs, improve productivity, and sustain international competitiveness. The upshot of this was that employment in mining in the Sudbury region declined from a high of 25,7000 in 1971, to 17,700 in 1981 and to 9,146 in 1991. One result was population loss for the region, from 170,000 in 1971 to 152,440 in 1986 ([www.srdc.on.ca](http://www.srdc.on.ca))

The positive feature of this era was that mining and mineral processing became steadily more technologically sophisticated and capital intensive. The Sudbury basin maintained its competitiveness in an ever-tougher international nickel market. The Sudbury area became a technological leader in high productivity and environmentally friendly technologies.

At the same time, the municipal government of the region was reorganized on January 1, 1973, so that the whole of the Sudbury Basin became part of the Regional Municipality of Sudbury, an area of 2,600 square kilometres, or about four times the size of Toronto. This has meant that the effectiveness of regional planning for infrastructure and the promotion of economic development have improved. In 1974, a Sudbury Regional Development Corporation was established to promote economic development of the area. Further improvements in transportation, such as the highway to Timmins and Cochrane also enhanced the "central-place" functions of the city.

During the 1990s, the Sudbury area appears to have reversed the decline of the previous decade and to have consolidated its position as the major mining centre of the region. This strengthening of its position is the result of a variety of factors:

1. INCO and Falconbridge have maintained and improved their competitive position in the Sudbury Basin.
2. The commercial sphere of influence of Sudbury expanded due in part to improved transportation. Mine-related goods and services enterprises now have access to approximately 90 mines within a 300-mile radius.
3. Effective civic leadership was important in improving the natural environment, beautifying the region, promoting economic development, supporting technological diversification, and promoting the location of regional health, educational, and governmental functions in the region.
4. Support from government at the Provincial and Federal levels was also important as they relocated some of their administrative apparatuses to Sudbury: the Ministry of Northern Development and Mines (with 250 jobs) from Toronto, and the Sudbury Taxation Centre from Ottawa (with 750 full-time and 1500 part-time jobs).
5. Strengthening of the roles of Laurentian University and Cambrian College in their support for research and training generally and specifically for the mineral economy.
6. The dynamism of the newly emerging enterprises surrounding mining is a final factor of significance ([www.sudbury-mining.ca](http://www.sudbury-mining.ca))

## **B. Sudbury as a Mining Metropolis in the International Arena**

By the year 2000, Sudbury had become an attractive and reasonably dynamic city. The Sudbury area has begun to establish itself as a centre for technological innovation in hard-rock mining with a consolidating range of minerals-oriented enterprises. The economy has become more dynamic with a series of other positive impulses. The landscape is returning to its natural state, and the city has become attractive in its healthy natural setting. Could Sudbury also participate more successfully in a hemispheric and global arena and beyond its regional base?.

One encouraging feature of the Sudbury economy at this time is the emphasis being placed on innovation. The roles of Laurentian University and Cambrian College in geological and mining areas are of special significance in the future promotion of a stronger mineral “cluster.” Laurentian University has offered full programs in Mining and Extractive Metallurgical Engineering since 1978, as well as general Civil, Mechanical and Chemical Engineering. Laurentian also has a strong Earth Sciences Program. There are a number of research centres such as the Laurentian University Mining Automation Laboratory (LUMAL) and the Mineral Exploration Research Centre (MERC). LUMAL focusses on areas such as the

analysis and system architecture of tele-remote/automated mining systems, 3-D animation and simulation of mining operations and control systems for vehicle-based transport systems. MERC focuses on support for mineral exploration not only in the Sudbury region but also in Canada and the world. A \$75 million Centre of Excellence in Mines and Mineral Research at Laurentian University is a multi-partner co-operative program with private and public participation. A commercial applied research park is being established by Laurentian University, in collaboration with the Government of Ontario and the Sudbury Regional Development Corporation ([www.srdc.on.ca](http://www.srdc.on.ca).) The offices of the Ontario Geological Survey and the Ontario Geo-science Laboratories have also been located at Laurentian University, and should provide support for the scientific infrastructure, which strengthens the mineral cluster in the Sudbury area.

Another important initiative is the establishment of NORCAT, the Northern Centre for Advanced Technology Inc. This Centre is a co-operative venture between Cambrian College of Applied Arts and Technology and private businesses. Its objective is to support enterprises with product development, technological transfer and training in resource industries generally, as well in as construction. In 1997, it acquired its own mine from Falconbridge for testing and training purposes. It has been involved in the development of 43 prototypes in mining and construction, and has programs in ten countries.

A variety of enterprises relating to the primary mining activity has become established in the Sudbury area. These include enterprises in manufacturing, business services, geological and management consulting, export consulting and services, mine automation and communication, equipment maintenance and repair, machine shops, electrical, plumbing and ventilation contractors, and manufacturers of various sorts. By 1999, some 20 of these enterprises had joined CAMESE (1999/2000), the Canadian Association of Mining Equipment and Services for Export, indicating that they considered themselves ready for competition in a global market.

Since 1978, Sudbury has made a major effort to restore its environment. About 17,400 hectares of land were barren and required re-vegetation and reforestation. A co-operative effort including the public sector, the private sector and the voluntary sector, restored some 3,200 hectares by 1997, with about 3,500,000 trees planted in the area. There appeared to still be a long way to go. But the main residential areas of the region were again realms of natural beauty. This environmental restoration is important if Sudbury is to be an attractive place to live for the skilled personnel who constitute the basic human foundation for a thriving and self-sustaining urban centre.

By 2000, Sudbury also had established a diversified service economy providing for the population in its region. It had become a major educational centre for its region. It is a regional health centre with about 2,700 employed in the Sudbury hospital system. It is a thriving transportation and wholesaling hub for its region, with strong transport links to the national

economy. Finally, its manufacturing sector employed almost 5,000 persons in 1996. With this degree of economic diversification around the central economic activities related to mining, the economy of the Sudbury region should be self-sustaining to a significant degree, as long as the fundamental mining and transportation activities remain vibrant.

As with any region in a larger national or “globalized” economy, there are risks and vulnerabilities which will have to be faced in the future. One such challenge relates to the health and competitiveness of nickel mining and processing. If some of the new or expansion projects coming on stream elsewhere increase supplies well ahead of demand, thereby reducing price substantially, and if they are significantly lower-cost producers than those of the Sudbury Basin, there could be a contraction of nickel mining in the region. The dilemma for the Sudbury region is that for the mines to remain competitive, further reductions in the labour force may be required, as automation and remote-controlled mining techniques are extended. But it is also imperative that the mines themselves remain competitive in the global nickel economy.

A second challenge relates to the relationship of the region to INCO and Falconbridge, the two mining pillars of the regional economy. These companies are headquartered in Toronto, not Sudbury, and do not necessarily have any primordial loyalty to the Sudbury region simply because that was the initial source of their existence and expansion.

A third vulnerability of the region arises from the fact that open-pit mining is steadily increasing its relative role in the global mining economy, largely because it is simpler and therefore lower-cost than underground mining which is technologically and logistically complex. The machinery and equipment producers of the Sudbury region specifically and Central Canada generally are geared to produce highly specialized products for underground hard-rock mining rather than the distinct machinery and equipment designed for open-pit mining. This means that the international market for the products of Central Canadian manufacturers on mining equipment may not be particularly expansive in the near future.

In sum, a transition from a successful mineral cluster for the regional mining economy to one which participates effectively in the international economy, may not be easy. One suggestion would be for the clusters centred in Sudbury, North Bay, and the Toronto areas to organize themselves as a “cluster of mineral clusters.” This would be useful in view of the very important range of mining related activities in the Toronto area including mine company headquarters, machinery and equipment producers, mine finance, geological, mining, and metallurgical consultants, and geophysical surveying.

## **7. Conclusion: Perspectives from Canadian Cases on Mine/Community Relations**

A variety of insights, perspectives and ideas from Canada's experiences regarding the relationships of mining activities and local communities may be of interest for the mineral-rich countries of Latin America. The following is a summary of the general, socio-economic, and environmental impacts of mining activities on local communities from the foregoing Canadian cases.

### **A. General Insights**

#### **(i) Mining can promote the socio-economic well-being of local communities and can also be environmentally benign.**

Despite some cases of environmental damage of legendary magnitude as occurred in the first 50 or 60 years of nickel mining in the Sudbury basin, mining can be managed so as to be benign in environmental terms. Some disastrously serious environmental damages can also be reversed. The Sudbury case illustrates this. The Potash Corporation of Saskatchewan's mine in Sussex New Brunswick is one which is astonishingly benign from an ecological perspective.

From a socio-economic standpoint, mining can also be particularly positive, and can contribute to local level community development and economic diversification. This was the case of Sussex, New Brunswick, and also of Sudbury, Ontario.

#### **(ii) The Implications of "Remoteness" for Mine/Community Relations**

The difficulties of the Diavik and Voisey's Bay cases arise from their remoteness as well as issues of their relations with First Nations communities. The New Brunswick and Sudbury cases demonstrated positive and productive inter-relationships with the local communities. In part this is because the mines in these areas fitted in easily to the mainstream socio-economic systems, in the more populated, established, and diversified regions of the country. In contrast, the Diavik and Voisey's Bay cases differ. Because of their magnitude and their technical, social, and economic novelty to the local communities, it will be more difficult for them to fit into the local societies without major disruption. This necessitates special public policy approaches, in order to ensure that the local communities benefit as much as possible.

#### **(iii) Long Distance Commuting" or "Fly-In / Fly-Out" mining may be the wave of the future for more remote mine sites everywhere.**

There have been no new mining towns established in Canada since about 1970. Instead, mines fly or transport their workers to the mine site from nearby communities, often by air travel, for varying periods of time, such as four days on followed by three days off (4/3) or other arrangements depending often of the length of travel. Mining systems which avoid the

construction of dedicated mining towns and which transport the workers to the mine site from their homes in other communities have a number of major advantages for more remote locations. Because of these advantages, they will likely be used increasingly in future.

## **B. Mining and the Local Environment**

### **(iv) Use an “Environmental Stewardship Fund or Foundation” Mechanism for those noxious mine and mill wastes which have to be stored in perpetuity.**

The solid tailings or liquid wastes from mine or milling operations, which are noxious and which must be stored and neutralized for ever, should be financed by the mine enterprise, not by the local, regional, or national communities. This can be done by requiring that the company contribute some monies, over the life of the mine, into a “Fund” or “Foundation” designed to manage the wastes *in perpetuity*. The interest from the capital of the Fund would be used for the maintenance or stewardship of the tailings mountains, the solid tailings ponds, or liquid tailings ponds. If the mine operation turns out to be cleaner than expected, and the wastes less costly to manage than expected, some funds could be returned to the mine enterprise. This would serve as a powerful incentive for the enterprise to manage the wastes carefully over the life of the mine.

### **(v) The value of Comprehensive Environmental Reviews for new mine projects.**

The comprehensive environmental reports prepared by the Canadian Environmental Assessment Agency provide examples of the type of analysis of the probable impacts of mines on all aspects of the environment which could be useful in other national contexts.

The process involved in constructing the reports seems useful. The mine enterprise first prepares an analysis of the mine and of its environmental consequences, together with a socio-economic assessment. It does this on the basis of its technical, geological and organizational knowledge of the project, together with knowledge of the communities and the natural environment and public meetings. The local communities, the regional governments, the Indigenous organizations, and other relevant Federal Ministries then make commentaries, criticisms, and elaborations. Interested NGOs have an opportunity to participate in the process as well. The mine enterprise then responds to these comments and criticisms. Finally, the Environmental Agency synthesizes, compatibilizes, and rationalizes the various analyses and perspectives, producing a summary and a detailed set of recommendations for modification of the project, if it is accepted. Or else, the Agency can halt a project.

### **(vi) Co-operative Monitoring of an Environmental Management Program.**

Monitoring of an environmental management program on a co-operative basis between the local communities, Indigenous organizations, and the mine enterprise is desirable in order to ensure that the program is implemented carefully and completely.

### **C. Socio-Economic Benefits**

#### **(vii) “Socio-Economic Agreements” between Mine Enterprises and Local Communities or Indigenous Organizations**

Prior to the receipt of permission to open a mine, the enterprise and the relevant local communities and/or Indigenous Organizations should be required to construct a mutually acceptable “Socio-Economic Agreement” or an “Impact and Benefit Agreement.” Such an agreement could include provisions for:

- Employment quotas or targets;
- Special training programs appropriate for local people;
- Targets for local procurement of goods and services;
- Support for local business development;
- Support for women’s employment and training as appropriate;
- A supportive work environment for distinctive local cultures;

Because of asymmetric knowledge between the mine enterprises and the Indigenous Organizations or local communities, particular types of support must be provided to the latter, in order to “ level the playing field.” This could be done by the public financing of NGOs or consultants services, or perhaps with public officials from other levels of government, who would provide some of the relevant technical, geological, marketing and organizational knowledge as well as techniques of negotiation.

#### **(viii) Promotion of Genuine Participation of Indigenous Peoples in Mineral Development**

Increasing numbers of mine projects are located in areas occupied by Indigenous Peoples in both Latin America and Canada. In many cases, these peoples have occupied the relevant lands since time immemorial and are the true owners of the mineral resources. Mineral projects can succeed in winning the support of local communities of Indigenous Peoples and in producing real benefits for their human development if they are genuinely integrated into the process of design, implementation and functioning. This means that the original project proposals must fully incorporate the particular environmental concerns and knowledge of the Aboriginal peoples as well as their economic activities in the affected areas into the planning process.

### **(ix) Development of the Clusters of Economic Activities around Mining**

For mineral-rich countries, development of the “mineral cluster,” or of those activities related to mining is an important means of developing some degree of economic diversification, and of capturing increased value added within the national economy. The case of Sudbury Ontario is a case of partial but incomplete development of the mineral “cluster.”

Promotion of such diversification around mining is difficult. However, some relevant public policies would be

- To promote the “culture” and elaboration of the cluster by supporting the relevant professional organizations, publications, and communications;
- To encourage procurement within the country, and export of goods and services from the “cluster” abroad.
- To promote the development of specialized human resources in the cluster through education at all levels;
- To support the provision of “public goods” for the cluster, including the development of relevant knowledge, physical and institutional infrastructure; and geological mapping;
- To construct a fair inter-sectoral tax system, which neither provides implicit subsidies or heavy “cash cow” treatment of mining.

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