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**KATIVIK ENVIRONMENTAL  
QUALITY COMMISSION**

**Decision regarding Canadian Royalties Inc.  
Nunavik Nickel Project**

**May 2008**



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## PROJECT ANALYSIS

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### 1. BACKGROUND AND CONTEXT OF DECISION

What with the positive economic climate in terms of mining development in Québec, and especially in Northern Québec, in addition to the Raglan mine already in operation and this project currently under review, there is a great deal of exploration going on in Nunavik, as the Kativik Environmental Quality Commission, referred to below as the Commission, is well aware. What is more, the Raglan and Labrador Trough areas are particularly attractive to prospectors looking for base metals. The Commission is conscious of the expanding mining footprint in Nunavik. It understands that if the economy remains favourable, the number of mineral exploration and mining projects will continue to increase, possibly at an even faster rate. It was with this in mind that the Commission analyzed the project under review.

Mining projects are automatically subject to environmental and social impact assessment and review under Section 23 of the *James Bay and Northern Quebec Agreement* (JBNQA) and Chapter II of the *Environment Quality Act* (EQA).

In April 2006, the Commission received the preliminary information document, or project notice, for the Nunavik Nickel Project (NNP) from the Deputy Minister of Sustainable Development, Environment and Parks. This Canadian Royalties Inc. (CRI) project involves the mining of four deposits of mostly nickel and copper and the processing of the ore extracted.

In July 2006, the Commission sent the Administrator its recommendations with respect to the directives, or guidelines, for the impact study to be prepared by the project proponent. In April 2007, the Commission received the proponent's impact study.

The Commission reviewed the impact study, then produced one series of additional questions in August 2007 and another in January 2008. The Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) sent the Commission the proponent's answers to these questions in October 2007 and February 2008 respectively. Furthermore, the Commission held public hearings from February 25 to 29, 2008 in the communities of Salluit, Kangiqsujuaq and Puvirnituk. In conducting its analysis, the Commission also benefited from the support of the provincial government department experts consulted regarding different issues and problems connected with this mining project.

### 2. PROJECT DESCRIPTION

The project calls for the open-pit mining of four deposits, primarily of nickel and copper, for a period of approximately 15 years: Expo, Mesamax, Mequillon and Ivakkak. These extraction sites extend from east to west over a total distance of approximately 50 km.

The project's main mining components are found in the watershed of the Puvirnituk River in Nunavik, about 82 km west of the village of Kangiqsujuaq and about 140 km southeast of the village of Salluit. The site is also approximately 20 km south of the Raglan industrial complex at Katinniq and 20 km or so north of Pingualuit National Park.

In the Expo site vicinity, the proponent plans to build and set up infrastructure which is to include an industrial complex for processing ore equipped with a mill with a nominal capacity of 3700 t/d (annual capacity of 1,350,000 metric tonnes), a tailings dump covering an approximate area of 1,200,000 m<sup>2</sup>, and an industrial wastewater treatment system. Also planned are a fleet of

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diesel generators (maximum 16.6 MW) and a waste treatment centre including a landfill site, a high temperature waste combustion unit, and facilities for storing hazardous material. In addition, the proponent intends to build offices, service buildings and housing for about 360 workers. At the Expo site, a drinking water treatment system and a biodisk system for the treatment of domestic wastewater will be installed.

At the Mequillon, Mesamax and Ivakkak satellite mines, the NNP calls for waste rock piles and a wastewater management system. At Bombardier Lake, the proponent plans to build and maintain a berm-bridge creating a reservoir as a source of freshwater for industrial and domestic use. Deception Bay has port facilities, which include a ship-loading dock, a warehouse for storing concentrate, a 15-million-litre capacity fuel depot, and a garage for maintenance. In addition, the proponent intends to build a camp there capable of housing 15 workers. There are roads from the four deposits to the Expo industrial complex, Bombardier Lake, and the Katinniq road leading to Deception Bay. Lastly, the proponent wants to build and operate a landing strip about 5 km from the Donaldson airstrip.

### **3. DESCRIPTION OF BIOPHYSICAL AND HUMAN ENVIRONMENTS**

#### **Biophysical Environment**

The extraction sites and industrial complex are located at the head of the watershed of the Puvirnituk River, which is made up of wide watercourses and shallow water bodies. This configuration favours widening of the river as opposed to a rise in water level when the flow increases. At first, the Puvirnituk River flows north to south through a shallow valley, then it bends and heads west, flowing through a canyon with cliff-like walls. After continuing westward for about 260 km, it spills into Hudson's Bay at the Inuit village of Puvirnituk.

The typically Arctic vegetation is composed of five broad habitat types: felsenmeer or "sea of rocks", polygonal soils with tundra ostioles, wet sedge tundra, riparian boulder pavement, and esker. An at-risk plant species, Bering hairgrass (*Deschampsia brevifolia*), has been found at three out of four of the mining sites: Mequillon, Expo and Mesamax. Also found was the sulphur buttercup (*Ranunculus sulphureus*), which is likely to be designated threatened or vulnerable but is not mentioned by the CDPNQ. Ellesmere Island whitlowgrass (*Draba subcapitata*), which had never been observed in Quebec before, was seen in the study area as well. Lastly, three colonies of Vahl's cinquefoil (*Potentilla vahliana*) were identified by the proponent in the Deception Bay area.

As far as aquatic fauna is concerned, the fishing activities in several watercourses and lakes in the study area in 2004 and 2006 showed low fish species diversity. Only three species were caught: Arctic char (*Salvelinus alpinus*), lake trout (*Salvelinus namaycush*), and slimy sculpin (*Cottus cognatus*). The first two were widespread, whereas slimy sculpin was only found in one small watercourse. Both lake trout and freshwater Arctic char, which is favoured by the rarity of competitive species and predators in northern freshwater areas, were found at the head of the Puvirnituk River watershed.

Many caribou (*Rangifer tarandus*) from the Rivière aux Feuilles herd cross the study area between June and August, during spring and fall migration. Field observation suggests that the western part of the study area near the Ivakkak and Mequillon deposits is used the most as a migration corridor.

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The location of the Rivière aux Feuilles caribou herd calving grounds varies, changing almost every year. Since the beginning of the 1990s, the study area has been within the herd's calving grounds. The study area was not inside the calving grounds legally designated in 1993, however. Subsequent to alteration of plans for this type of wildlife habitat in 2007, part of the legally designated calving grounds for this herd is now within the study area.

Arctic fox (*Alopex lagopus*) are found in the study area and many individuals have been observed close to camps during exploration activities. When the field surveys were being conducted, however, no fox dens were seen around the Mesamax, Expo, Mequillon or Ivakkak mines. Two dens were discovered, though, in the Deception Bay area.

The study area is used by at least three raptor species: the golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), and snowy owl (*Bubo scandiaca*). When the proponent's field surveys were done, nests were only found for the peregrine falcon, although immature golden eagles were observed. Two peregrine falcon nests were detected in the cliffs along the Puvirnituk River, approximately fifteen kilometres southwest of the Mequillon mine. The golden eagle is designated as a vulnerable species by the Quebec government and as an at-risk species by the Canadian government. The peregrine falcon, likely belonging to the *tundrius* subspecies, has been designated as a species of special concern by the Committee on the Status of Endangered Wildlife in Canada.

In the Deception Bay area, 22 bird species are found during reproduction or migration periods. One of these species, the harlequin duck (*Histrionicus histrionicus*), which is likely to be designated threatened or vulnerable by the Quebec government and of special concern by the Canadian government, can be seen in the area during migration. Barrow's goldeneye (*Bucephala islandica*), another species that is likely to be designated threatened or vulnerable by the Quebec government and of special concern by the Canadian government, is merely an occasional visitor to the bay area.

Five pinniped and five cetacean species use Deception Bay at one time or another of the year to meet their needs, but especially in the summer. It is important to note that one of these species, the ringed seal, gives birth to its pups and raises them there between March and June. Seal pups stay on the ice until they are old enough to forage for food on their own.

Anadromous Arctic char are also found in large numbers in the bay, migrating from it to the Deception River during the summer in order to reproduce in the watercourses of this watershed.

## **Human Environment**

The people most affected by the project are three Inuit communities: Salluit, Kangiqsujaq and Puvirnituk. In 2001, Puvirnituk had a population of 1,170, Salluit 1,072, and Kangiqsujaq 535.

The way of life, culture, and economy of these communities are based on hunting, fishing, and trapping, and the Inuit place a great deal of importance on these subsistence activities: they have helped shape Inuit culture and continuing to practice them is important if the Inuit are to retain their identity.

The area used the most by these Inuit inhabitants for their subsistence activities is the shoreline, including Deception Bay. Although not to the same extent, the interior is also used, for freshwater fishing and hunting land mammals and waterfowl. One of the more frequently used areas, Mequillon Lake, is a very popular spot for fishing. Caribou are hunted in the area as well but this varies with migration patterns. For the people of Puvirnituk, the river of the same name is particularly important because it is the municipality's source of drinking water. What is more,

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the communities of Salluit and Kangiqsujaq have witnessed the positive and negative effects of mining development over the past ten years, especially those stemming from the Raglan project.

#### **4. SOCIAL ACCEPTABILITY**

In order to take the pulse of the three communities affected the most by the project, the Commission held public hearings in each of them between February 25 and 29, 2008. It began with Puvirnituk, moved on to Salluit, then concluded the exercise in Kangiqsujaq. Two hearing sessions were held in each location and presided over by the Commission Chair. All questions, views, and testimony were heard. Generally speaking, the matters that were raised more frequently in all of the communities were fear of subsistence hunting and fishing being compromised by contamination of the biophysical environment, social changes stemming from mine work, and monetary compensation for loss of enjoyment of the territory and its resources.

##### **Puvirnituk**

In addition, a number of more local issues emerged during these consultations. For example, in Puvirnituk, the quality of the water in Puvirnituk River, the community's source of drinking water, was consistently a concern, despite the fact that the treated mining effluent would presumably be discharged into Puvirnituk River about 260 km away. This worry, which was shared by all stakeholders, was accompanied by various fears relating to the long-term viability of wildlife resources after the mine is shut down. In this community, the position of the municipal council, conveyed by the mayor, was a mixture of support for the project due to the associated job prospects and concern that potential environmental contamination would threaten the community and its sources of food and water.

##### **Salluit**

In Salluit, the municipal council, the landholding corporation, and the citizens themselves were unanimously opposed to the project. The history of mining development in this area and the related impacts over the past forty years appeared to weigh heavy in the balance when it came to the negative positions expressed at the hearings. The Asbestos Hill mine, in operation between 1972 and 1984, and the Raglan mine, owned by Xstrata Nickel and authorized in 1995 by the Ministère de l'Environnement et de la Faune (MEF), impacted Deception Bay and its surroundings, as well as the environment's users. Although the Raglan mine created 46 jobs for the people of Salluit, there appeared to be considerable dissatisfaction among them, particularly those using the Deception Bay area. As with Puvirnituk, contamination of the environment was at the heart of the concerns expressed by the hearing participants, particularly the problem of dust raised by trucks carrying ore concentrate from the Raglan mine to Deception Bay. This dust is perceived as a contaminant that degrades the environment, and especially François-Malherbe Lake, which is located in the Deception Bay area and traditionally used by the Inuit. In fact, users with camps in the area no longer drink the lake water and are reticent about eating the fish they catch there. What is more, winter fish mortality, which is frequent in the lakes of the Ungava Peninsula, due to a decrease in oxygen levels in the winter, is now attributed to mining even though no effluent is discharged into these lakes.

The Commission also noted during the hearings a certain difference of opinion between the Salluit village authorities and the Makivik Corporation, the political entity that represents all of Québec's Inuit people and negotiates and concludes impacts and benefits agreements signed with the proponents of development projects in Nunavik. CRI negotiated an agreement in principle

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with Makivik first and this prompted discontent among some of Salluit's citizens, who felt like they had been excluded from negotiations. Nevertheless, as indicated in section 5, the proponent negotiated with the Qarqalik Landholding Corporation of Salluit, which countersigned the Nunavik Nickel Agreement, referred to below as the Agreement, in April of 2008.

With regard to perceptions of the mining project's impacts, the Commission noted that the Raglan Committee, which was responsible for discussing the hiring and training problems encountered, but also environmental problems, with the people of Salluit and Kangiqsujaq, presumably did not manage to get through to the whole community in connection with this project authorized in 1995. This has resulted in rumours and perceptions being confused with reality, leading to a very negative attitude towards any further mining in the area. This whole situation presents CRI with a major challenge in terms of communication with Inuit communities.

### **Kangiqsujaq**

The hearings held in Kangiqsujaq revealed that opinions were divided concerning this new mining project, especially since it would be close by and, once more, environmental contamination was feared by the community. The landholding corporation stressed the fact that the community uses the land immediately surrounding the four project deposits. The municipal council, on the other hand, spoke out on behalf of the project, mostly due to the jobs and spin-offs it would bring to the community. The citizens themselves were inclined to be against the project but considered its authorization inevitable.

The Commission noted that the members of the three communities affected by the project were, to varying degrees, mostly opposed to the project, mainly because they were afraid that the environment that was so vital to them would be badly and irretrievably contaminated. This opinion was based on the fact that mining in the region had not always been carried out with much consideration for the environment, as the Inuit with experience of the Asbestos Hill mine project knew only too well. As far as the Raglan mine was concerned, it was subject to the legislation in force and the conditions for authorization of the certificate issued by the MEF in 1995. Nevertheless, these conditions did not prevent the residents of Salluit and Kangiqsujaq from perceiving this mining project as harmful to the environment. The Commission therefore considers that the proponent needs to develop an information program targeting the citizens of these three communities.

## **5. NUNAVIK NICKEL AGREEMENT**

The Sanarrutik, a partnership agreement on economic and community development in Nunavik which was signed in 2002 by Makivik, the Kativik Regional Government (KRG), and the Québec government, encourages mining proponents to conclude agreements between Makivik and mining companies with regard to the monitoring programs and compensatory measures to be used, financial arrangements, jobs, and contracts. In conjunction with the NNP, CRI negotiated an impacts and benefits agreement with Makivik. That agreement, which is now referred to as the Nunavik Nickel Agreement, was approved by Makivik's board of directors, which had authorized its chair to sign. The proponent also negotiated with the Qarqalik Landholding Corporation of Salluit, the northern village of Puvirnituk, and the Nunaturlik Landholding Corporation of Kangiqsujaq, and on April 9, 2008 all three of them countersigned the agreement already ratified by Makivik. A number of amendments were made to the agreement as a result of the negotiations with the three Inuit communities.

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Unlike the agreement concluded with Xstrata, which provided for employment floors for the Nunavik Inuit covered by the JBNQA, the agreement with CRI focuses on training a minimum number of Inuit. The proponent decided to concentrate on training these people in order to give them access to a wider range of jobs. The provisions regarding the Inuit training program were included in the Nunavik Nickel Agreement and will be implemented as soon as construction begins in order to create as many openings as possible for the start-up of operations. In addition, all job categories will be open to the Inuit and, all else being equal, they will be given priority in the following order:

- ◆ Inuit living in Salluit, Kangiqsujuaq and Puvirnituk;
- ◆ Inuit living in other northern villages or elsewhere;
- ◆ Non-Inuit living in Nunavik or elsewhere.

Initially, training will primarily be oriented towards cleaning/upkeep and the operation of heavy machinery required to meet start-up needs. A number of on-the-job training programs will also be offered, as well as scholarships and bursaries, summer classes, etc.

In addition, CRI will give priority to Inuit businesses when subcontracting work out during the construction and operation phases. Companies offering air transport, marine cargo shipping, and diamond drilling services should be especially in demand. In addition, whenever it can, CRI will divide these services up so that Inuit companies can obtain some of the contracts.

The Nunavik Nickel Project stipulates that CRI will pay royalties, based on the price of nickel, to Makivik and the communities of Salluit, Kangiqsujuaq and Puvirnituk, to compensate for the project's environmental and human impacts.

The agreement also provides that no concentrate is to be transported in Deception Bay between mid-March and mid-June. In addition, no more than three concentrate transport trips will be allowed between December and mid-March, unless special arrangements are made beforehand with the Qarqalik Landholding Corporation of Salluit. The proponent will also have to pay royalties for the three boat trips during the ice cover period.

What is more, the proponent will have to annually monitor the quality of raw untreated water and drinking water, and of the tissues of fish from the Puvirnituk River. If any contamination from mining operations is detected, the Puvirnitumiut will be informed immediately and steps taken to remedy the situation. In addition, CRI will work with the municipality of Puvirnituk on an emergency plan in order to ensure a continuous supply of drinking water. The proponent is supposed to hire experts in 2008 to prepare this plan with the municipality. The emergency plan must be in effect before the NNP operation phase begins.

With regard to the environmental monitoring program, once a year CRI will have to invite two Inuit representatives to participate. The proponent must inform the Nunavik Nickel Committee of the program results. In addition, if an Inuit representative so requests, the results will have to be sent to the Nunavik Research Centre at Kuujuaq for validation.

The Commission considers the Nunavik Nickel Agreement, ratified by Makivik and countersigned by the Qarqalik Landholding Corporation of Salluit, the northern village of Puvirnituk, and the Nunaturlik Landholding Corporation of Kangiqsujuaq, to be a private agreement. In this sense, the Commission does not wish to comment on its content but nevertheless considers it to be a form of social acceptance of the NNP by Makivik and the three communities that will experience the most impacts. Despite this agreement, though, some of the

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remarks and views expressed at the public hearings are still of concern, and the proponent and the organizations concerned would do well to accord them special attention. The issues and problems covered in the next section were partly determined by these concerns.

The Commission reminds the proponent, however, that the provisions of this agreement, or any conditions that might eventually be negotiated in conjunction with another private agreement, do not under any circumstances allow contravention of this decision.

## **6. ISSUES AND PROBLEMS**

Up until now, there has only been one mining operator at a time in the Nunavik region. From 1972 to 1984, it was the Asbestos Corporation, which mined a major asbestos deposit at Purtuniq. Since 1995, Falconbridge, now named Xstrata, has been mining mostly nickel at its Raglan mine and processing it at its Katinniq industrial complex. Within the framework of the project under study, a second operator, CRI, would like to undertake mining operations at the same time on its property near the Raglan mine.

This presupposes that from now on these companies will be "cohabiting" – no easy task in practice – and that there will be greater pressure on the environment. This cohabitation gives rise to new considerations, notably in terms of the sharing of infrastructures and the complexification of environmental monitoring of mining activities. These considerations are added to the environmental analysis generally required for this type of project. It is crucial to take them into account in analyzing issues and problems because they are bound to take on growing importance, given the increase in mineral exploration by several mining companies.

### **6.1 Overlapping Infrastructures**

The mineral development that has been taking place in this part of Nunavik for almost 30 years now is articulated in large part around the use of existing transportation infrastructure, such as the Deception Bay dock, the road from the dock to the mineral deposits and the three landing strips built in recent years, including the Donaldson one which is still in operation. Many secondary roads were also built in all directions to meet specific, well-defined needs. These infrastructures, which were built when the Asbestos Hill deposit at Purtuniq was being mined and, after that, when the nickel deposit at Katinniq was being mined, facilitate mining development at both the exploration and operation stages.

Considering that mineral development in this part of the territory is likely to expand and continue to do so for many years to come, the Commission prefers that these facilities be re-used or used jointly with any other companies involved. In practice, this means limiting the footprint of these projects as much as possible and adopting a sustainable development approach to territory management.

In the Commission's view, land use needs to be planned in such a way as to avoid an increase in the number of these infrastructures, or at least limit them to the number of companies active in the area. Road infrastructure calls for a different approach, in that roads are public and can be used jointly with other companies operating in the area anytime. This entails joint road maintenance, and especially joint dust management, by users.

In the case of the project under study, the Commission understands that a number of infrastructures will be required in connection with transportation, ore processing, worker logistics, and waste management. The idea is to ensure that the company has the flexibility it needs to mine the mineral deposits covered by the project. The Commission considers, however,

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that above and beyond the current exercise, territory managers must assert their prerogative to agree on or, if necessary, impose optimization of the use of these infrastructures and consequently of the territory.

### **Road Infrastructure**

The importance of the problem of controlling dust on roadways became apparent during the public consultations held last February. The generation and transportation of dust from the Raglan mine tailings dump and the road between Katinniq and Deception Bay clearly inconvenienced and worried the territory's Inuit users, who are inclined to see the NNP as unacceptable in this regard since it could exacerbate the problem. The Commission noted two important points in the testimony at the hearings: the possibility of the Katinniq road and the mine tailings dump, composed of fine material, generating dust which would circulate in the area and pollute the surrounding environment. Already, as pointed out above in the section dealing with social acceptability (section 4), negative consequences are being felt in terms of territory use in the François-Malherbe Lake area.

The proponent has emphasized the possibility of using dust control suppressants such as calcium chloride on roadways. It indicated that if this product needs to be used, it would not be applied within 50 metres of crossings over low-flow rivers. The Commission would like to stress that, according to the proponent, road maintenance costs will be shared in proportion to the tonnage transported in the case of shared road sections used by both companies. Maintenance costs for other areas will be assumed by the user. This means that CRI and Xstrata will have to share the responsibility for suppressing dust on the road from Katinniq to Deception Bay. They must work together on a plan for dust control management on the road according to season, temperature, and traffic, within a context where the Inuit are very worried about dust generated on the road and carried by the wind to the land and aquatic environment. They will therefore need to act both at the source of the impact and vis-à-vis the Inuit people, who see their environment as being contaminated and dangerous to the health. Communication initiatives must be undertaken dealing with what the actual impacts of this dust really are, in order to prevent the sort of behaviour described at the public consultations – fear of consuming water or fish – from becoming ingrained.

Regarding dust that might come from the planned tailings dump at the Expo deposit, it is important to understand that this concern too stems from the negative experience of the Raglan mine tailings dump, which on very windy days can generate dust that is visible to the naked eye. In fact, Xstrata is having to environmentally monitor the propagation of this dust around its facilities and at certain sites positioned according to the dominant wind and the receiving environment. It goes without saying that CRI will have to perform the same kind of environmental monitoring, even though the tailings produced by nickel concentration will not be as dry as those from the Raglan mine. This should allow it to ensure that surrounding water bodies will not be contaminated by this dust and to check the project's impact on Pingualuk Lake, as explained below in the section dealing with impacts on Pingualuit National Park (section 6.6).

### **Mine Waste Management**

The proponent has promised to limit the amount of residual material produced by the NNP as much as it can. For one thing, it will choose products with a minimum of packaging. In addition, it will set up a source separation system for waste to allow re-use of recyclable materials (e.g. wood, metal, etc.). Some materials, such as compacted empty oil drums, will be taken by truck

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then by boat to a specialized recycling plant. In addition to reducing the amount of waste, this measure limits the risks of soil and surface water contamination by residual hydrocarbons in empty drums. Considering the isolated location of the mine, and its distance from waste recovery centres, relatively little residual material will be recycled.

The proponent plans to have a waste treatment centre that includes a landfill site, a high temperature combustion unit, and storage facilities for hazardous materials. All combustible residual material which cannot be re-used, recovered or recycled will be burned daily in the high temperature combustion unit in order to further reduce the amount of waste. This combustion unit will be used to burn domestic waste (approximately 895 m<sup>3</sup>/yr) and used oil (about 50 m<sup>3</sup>/yr). The landfill will take care of approximately 300 m<sup>3</sup>/yr of waste, including the ashes from the thermal combustion unit (about 135 m<sup>3</sup>/yr) and the septic sludge from the wastewater treatment system (about 150 m<sup>3</sup>/yr). Until it is incinerated, domestic waste will be stored temporarily in closed containers to avoid attracting animals. The landfill will not generate much liquid effluent since the bulk of the waste there will be dry material. Septic sludge is added once it has been dried.

It should be pointed out that in response to the first series of questions it was sent, the proponent noted: [Translation] "Should Xstrata become more open, we would look into the possibility of sharing waste management facilities."

On the other hand, in response to the second series of questions, the proponent agreed that the preferred sites still needed to be optimized. "The location of the waste management site might change, however, as indicated in the map attached to Appendix 9 of this document. This potential site, which is located near an esker, offers several advantages – in terms of its construction particularly, due to the availability of granular materials. It is also possible that both sites will be used."

Since the management of the residual material produced by the proponent still needs to be optimized, the Commission asks CRI to submit its optimization plans to it and for them to include the following:

- ◆ joint operations with Xstrata for sites already in operation, explaining advantages and disadvantages; and
- ◆ the sites actually selected, with advantages and disadvantages.

A site will be chosen for storing vehicles, equipment and machinery that are outdated or no longer working. At the end of the project, the proponent plans to send these vehicles, equipment and machinery back south or transport them to the landfill site. To the extent that this is possible, the proponent should avoid disposing of them in landfill and report the amount of bulk metal it sends south, comparing it to the amount left on site.

Lastly, according to projections, the NNP should generate the approximate equivalent of four marine containers of used tires a year. When the environmental and social impact study was submitted, the proponent had two tire management solutions for disposing of used tires: landfill and, if the costs were covered, recycling. The proponent has decided, however, to favour the second management solution and has committed itself to sending used tires south at the end of their useful life (after re-treading and re-use) for reduction to shreds and/or powder to be used in manufacturing different products. Needless to say, the Commission is in favour of this management solution.

### **Construction and Operation of a Second Dock**

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CRI will have to make 10 to 20 boat trips a year to transport concentrate and five trips to replenish fuel, food, and other supplies. Xstrata's operations require about 6 trips a year in Deception Bay. This number will increase to 15 trips a year by 2008 or 2009, with the production increase recently authorized by the MDDEP. Xstrata also plans to step up production again around 2012, bringing the number of trips to over 25 a year. The annual number of trips in Deception Bay will therefore increase from approximately 15 in 2008-2009 to about 30 as of 2010 for the two companies.

Originally installed by the Asbestos Corporation, the loading-dock currently occupied by Xstrata and the warehouse at the Deception Bay site were substantially revamped by this company in the summer of 2007. Since Xstrata's occupation of the dock is estimated at approximately 200 days a year, the occupation rate is around 70%. This rate increases to over 80% if the dock's use is limited during the spring moratorium. Under the circumstances, the Commission understands that the flexibility required to allow both mining companies, Xstrata and CRI, to operate there with ease is pretty much out of reach. This is all the more true in that current mineral exploration indicates that mining operations will hold their own or grow in coming years.

In addition, the technologies used by these two companies involve concentrate storage and loading procedures that are not conducive to the joint use of existing facilities. For instance, the nickel concentrate from the Raglan mine is dry and requires a vacuum loader, while the NNP concentrate will be wet and need a conveyor belt system.

In view of the above, the Commission considers a second dock at Deception Bay justified. It is also justified due to the fact that the proponent has committed itself to keeping the dock public and therefore open to other users.

This having been said, the new dock should be designed and built with a number of concerns in mind, mostly to do with sediment disposal during dredging operations. The final decision with regard to dredged sediment management and disposal will have to be submitted to the Commission.

### **Construction of a New Airstrip**

When the impact study was submitted, the proponent stated that its needs in terms of air service could be met by sharing the Donaldson airstrip facilities owned by Xstrata, which were already in place.

In February 2008, in response to the Commission's second series of questions, the proponent explained: "Since Canadian Royalties was unable to reach an agreement with Xstrata, an addendum to the impact study has been filed with the Commission regarding the construction of an airport at the Berbegamo mine exploration site. Due to technical, economic, and environmental considerations, we have decided to site the airstrip serving NNP along the road to Douglas Harbour, about 5 km from the Donaldson airstrip and 40 km from the Expo industrial complex."

The Commission understands that the proponent needs reliable, safe air access for its operations to run smoothly. According to the proponent, it tried – unsuccessfully – to negotiate with Xstrata the right to use the existing Donaldson landing strip. Apparently, several attempts were made at bridge-building with Xstrata by the Québec government and the Kativik Regional Government (KRG), but they evidently did not bear fruit.

During the public consultations held by the Commission, this project component was raised repeatedly by residents of the communities visited and by the KRG Chair, who were opposed to

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the construction of a second airstrip near the existing Donaldson airport. The proponents themselves indicated during the public consultations that building a new airport was a second-best scenario.

The proponent indicated in the information provided that the airstrip it planned to build would only be used by aircraft two or three times a week. Apart from solving the proponent's air access problem promptly, there does not appear to be any other justification to building this new airstrip about five kilometres from the existing Donaldson landing strip. One could of course consider that due to its public nature, it might partly resolve current air access issues for other development projects, but this remains purely hypothetical. One could also argue that, due to its position, this second airstrip might offer greater flexibility in the event of bad weather. This has not been proven either, however. What is more, the possibility of a second airstrip positioned differently was considered by Falconbridge when its project was being authorized, and one has to admit that, 15 years down the line, the current airstrip still appears to be doing its job satisfactorily.

In order to limit the ecological footprint of mining projects and adopt a sustainable development approach to territory management, the Commission cannot support the authorization of this project component consisting of the construction of a new landing strip. The Commission considers that it is important for the authorities concerned to supervise mining projects in an exemplary fashion and consequently that the parties involved must behave responsibly and use the Donaldson airstrip jointly.

## **6.2 Waste Rock and Tailings Management**

Based on the results of the acid generation potential tests, the proponent decided to consider all mining waste (waste rock and tailings), with the exception of waste rock from Ivakkak, to be potentially acid generating even though the proportion of the different lithologies, or rock types, likely to generate acid varied from one deposit to the next.

At the Expo site, the mine tailings dumping area will contain all the tailings generated by the concentration process from the Expo, Mesamax, Mequillon and Ivakkak deposits and will have an estimated life of 12 years. This tailings dump will have four cells, one containing waste rock from the Expo site only and the other three containing mill tailings which will be covered over by waste rock, including that from Expo.

Berms made of waste rock considered to be acid generating from the Expo deposit will be installed around the dump to confine the thickened tailings. An airtight and watertight barrier – impermeable membrane – will be applied to the base and sides of each cell to protect waste rock and tailings from potential contact with oxygen or runoff water. This arrangement creates an impermeable environment for tailings on the internal surface of the berms and at the base of each cell. The year after construction of the berms is completed, their outside surfaces will also be covered with an impermeable geo-membrane.

The proponent is aware that an acid generating reaction could be triggered when the waste rock or tailings stored in the cells are exposed to air or precipitation. To reduce this impact, it plans to change their deposition location inside the cell in such a way that particles are only exposed to air for six months before being covered up by a new layer of fresh tailings. This will limit the introduction of oxygen and the resulting oxidation of the waste deposited in the cells to fine layers buried under more recent waste.

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As far as the waste rock used to build the berms is concerned, the lithologies confirmed as having acid generation potential will be mixed with less reactive materials, thereby decreasing the speed at which the acid generating reaction is triggered. Also, according to the proponent's tests, the waste rock from the Expo pit, which will be used to build the berms, has an acidification potential (AP) that will be borne out between 5 months and 14 years after its exposure to air. So that it is prepared for all eventualities, the proponent intends to collect and treat all water that comes into contact with uncovered waste rock, in order to prevent acid effluents or contaminants from being released into the environment and spreading.

The proponent plans to stockpile waste rock from the Mesamax, Mequillon and Ivakkak deposits in waste rock piles near their respective extraction pits.

The acid generating potential of the waste rock from the Mesamax and Mequillon deposits varies according to lithology and sulphur content. The proponent will be treating the waste rock from these two deposits as potentially acid generating. As for Ivakkak, the waste rock from this deposit is not considered by the proponent to be potentially acid generating.

In the cases of Mesamax and Mequillon, in order to minimize water infiltration and prevent possible migration of contaminants to the environment, the proponent plans to cover waste rock piles, once the mining is over, with an impermeable geo-membrane, covered in turn with granular material to ensure protection and limit erosion. The proponent does not plan on covering the Ivakkak waste rock pile, however, because it does not have any acid generating potential.

Like the proponent, the Commission recognizes that acid mine drainage (AMD) is the chief problem connected with tailings and waste rock management. It considers that AMD must be controlled extremely carefully considering how isolated the mining site is and how difficult it will be to intervene if required after the shutdown.

Regarding the prevention of AMD generation, the Commission notes that, unlike the Xstrata mining operation, the proponent's AMD confinement and control solution does not take the possibility of tailings becoming encased in permafrost into account as a stabilization measure. In practice, CRI does not count on this natural AMD inhibition phenomenon, which the Commission considers prudent in the long term, given the context of climate change. The solution retained, based on confining tailings and waste rock and preventing them from coming into contact with the oxygen in the air or with precipitation, appears to be a good permanent environmental protection solution, provided that this waste is covered properly. It should also be pointed out that the permafrost currently present will limit AMD by encasing waste rock and tailings, which makes it an additional temporary measure.

Nevertheless, in order to keep an acid generation reaction from being triggered as effectively as possible, it is important to evaluate the period, before being covered up, during which tailings and waste rock oxidation could occur at the Expo site and cause problems. In the case of tailings, and those in Cell 1 specifically, the covering process will begin after the fifth year of tailings deposition in the cell. Apart from the water treatment, however, the proponent does not propose any measures for preventing acid generation before the final covering-up.

By the same token, there are still details that need to be filled in regarding paste tailings behaviour during deposition, particularly in terms of their segregation according to particle size, dryness, and vulnerability to wind erosion given the large size of the confinement cells.

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Although it sees the proponent's proposed mine waste management as acceptable environmentally, the Commission considers that, given the isolation of the mining site, CRI should do absolutely everything in its power to limit the development of environmental problems that would require regular, ongoing interventions, even after mining operations are shut down. Within this context, the Commission believes that additional efforts should be made to counter the risk of AMD and wind erosion at waste rock piles and tailings dump cells and dikes before they are covered up for good.

The promoter indicates that around the twelfth year, it will stop depositing mine tailings in the Expo site tailings dump and direct them instead to the Expo site pit, and that sinking is the management method planned for the tailings in this pit. The Commission approves this solution.

However, since certain details still have to be worked out, the proponent will have to present them for approval when the time comes to deposit the tailings in the pit.

### **6.3 Mine Site Water Management**

In its second series of answers, the proponent sent a new water balance sheet for a rate of water use of 3,700 tonnes a day, including water channeling and the water treatment method to be used for industrial wastewater at the Expo site.

The freshwater needed for the process will come from the reservoir created by installing the berm-bridge at the Bombardier Lake outlet; uncontaminated runoff water in the area surrounding the facilities will be diverted off-site.

The proponent wants to recycle its mining process water. An aging pond will allow it to store overflow from the thickening of copper and nickel-copper concentrate, overflow from the tailings thickening process, and water from precipitation. In theory, mining process wastewater to be re-used will be directed to the aging pond and finally to the water reservoir for use.

The recirculation rate anticipated by the proponent for the process water will be at least 85% and could reach total recirculation. In the first case, approximately 15% of this water might then have to be directed to the major pond. It should be noted, however, that the aging pond water that would then be directed there will have been kept at a temperature of 20° C up until then. This means that in order to be able to document the effects of this effluent in the river, the temperature will have to be monitored so that any eventual changes in river temperature patterns can be detected.

During the winter time, accumulated precipitation that has been in contact with the exterior of the tailings dump and waste rock pile dikes will be stored in the cells. Starting when the snow melts in spring, the water stored in the tailings dump cell or cells goes to the settling pond, called the major pond, which is not used in the winter. This pond will then also receive runoff from the mill area and the building complex, water from the Expo pit, and runoff stored in the intermediate northern pond located at the low level point.

No treatment will be performed in the major settling pond: it will only be used for storage, and designed in accordance with the appropriate requirements. The water collected in this pond will be pumped out to a treatment system – a lamellar settling pond in this case, located near the mill and south of the major pond.

This lamellar settling pond will generate effluent that will be discharged into the environment by a system of conduits leading to a Puvirnituk River tributary near the site originally intended for a dam. This effluent, with a continuous flow of 450 m<sup>3</sup>/h, will spread over a maximum of 120

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days, depending on the weather. Contrary to the stipulations in the impact study, no winter effluent is anticipated .

The industrial wastewater from the Mesamax, Mequillon and Ivakkak satellite mines will be collected in respective treatment tanks and discharged subsequent to treatment to their respective effluent points at a flow rate of 350 m<sup>3</sup>/hr flow.

Within a context of potential AMD, associated with tailings and waste rock management, the proponent plans in the short term to use the catchment and treatment of water at the mining sites to prevent acid generation. The wastewater stemming from the project will produce effluent that will be discharged into the Puvirnituk River watershed.

At the Expo site, the wastewater will be treated using a biodisk system, and ultraviolet treatment is also planned before the water is discharged into the environment. According to the information provided in the proponent's first series of answers, the effluent point will be the same for industrial wastewater. Domestic wastewater from the satellite mines will be transported by vacuum truck to the Expo industrial complex for treatment.

The protection of the quality of this river's water is especially important because the Puvirnituk River is at the northern boundary of Pingualuit National Park and because it serves as a drinking water reservoir for the people of Puvirnituk. As mentioned in section 4, although it is quite a distance from the mining site, this community has already shown that it is very worried about water quality changing. Since the proposed project entails the use of the Puvirnituk River as the receiving environment for industrial and domestic wastewater effluent, the Commission wishes to ensure that this use will not affect the quality of the river water or the uses it is put to.

In complying with Directive 019 on the mining industry, issued by the Ministère du Développement durable, de l'Environnement et des Parcs, the proponent ensures that the reference framework for mining projects in Québec is abided by. However, the application of environmental discharge objectives (EDOs) to the aquatic environment makes it possible, if necessary, to define discharge requirements that are complementary to those set out in Directive 019, allowing the optimization of the location of the final effluent discharge point, certain operating practices, or methods for mine wastewater treatment and mine tailings management.

Initially, the proponent performed this exercise primarily to address concerns about water quality in the Puvirnituk River, in order to meet the needs of Pingualuit National Park users and the people of the village of Puvirnituk. According to the information submitted by the proponent, the current uses of the Puvirnituk River will be maintained, which confirms the views of the MDDEP experts consulted.

In order to check the effects of the effluent discharged and ensure maximum protection of the aquatic environment, the proponent will have to set up a monitoring program. The Commission considers that the proponent must present the program it intends to implement to meet the EDOs to be defined by the MDDEP, taking into account the environmental monitoring results it obtains for the reference state in particular. This initiative might be reconsidered in years to come, depending on the monitoring program results. Following a review such as this, the proponent would have to adjust its effluent treatment technology to meet these objectives.

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## 6.4 Impacts on Receiving Environment

### Changes in Receiving Environment Use

The construction and operation phases of the mining project will have the same effects on the use of the environment by the Inuit in the area in that the disruption stemming from construction activities will continue on for as long as the deposits are mined. According to the information in the documents submitted in support of the application, the disruption stemming from noise, machinery and truck traffic, operation of the mill, and human presence in general will have impacts on traditional activities such as fishing, hunting, and trapping in the project area. It has been acknowledged that the Inuit of Salluit and Kangiqsujuaq use this area as hunting grounds. As for fishing, the residents of Salluit concentrate on the Deception Bay area, while those of Kangiqsujuaq use Vaillant and Mequillon lakes, which are located immediately south of the Mequillon deposit.

During both the construction and operation phases, animals traditionally hunted and trapped by the Inuit will probably move to quieter areas, which could mean that hunters will have to travel farther. Unfortunately, there is not much that can be done to mitigate this impact. On the other hand, fishing will still be possible and the proponent has promised to prevent conflicts from arising between workers and the Inuit in relation to this activity. It proposes a number of mitigative measures, including the introduction of a sport fishing program designed to prevent lakes in the mining operation vicinity from being overfished. In order to reduce fishing pressure, there will not be any measures to accommodate fishers in terms of transportation to fishing sites, conservation, or on-site consumption of the catch. Mine employees will monitor the sport fishing situation. Finally, access to the lakes used by the residents of Salluit and Kangiqsujuaq will be maintained for fishing.

During the public hearings, three potential impacts on subsistence activities were discussed: disturbance of hunting and fishing activities, a potential decrease in wildlife abundance, and potential degradation of animal tissue quality. The first two points will likely be verified in the project's immediate surroundings. Fishing will remain possible everywhere, Bombardier Lake included. The current tranquillity will be disrupted by greater human presence, however. The proponent responded to these concerns by pointing out that the ratification of an impacts and benefits agreement before the project's construction phase would include the sharing of project earnings, a measure which would help compensate for all the impacts of the NNP construction and operation.

With regard to changes in seal hunting practices in Deception Bay because of boat traffic, this impact will be covered in section 6.5 dealing with the bay's use.

The third point raised at the hearing, the degradation of animal tissues, the proponent pointed out that the monitoring of fish in the area exposed to the final effluent from the Raglan mine between 1994 and 2002 did not reveal any changes in metal levels in fish tissues that could be associated with the mining operation. In addition, there was no statistically significant build-up of metals in the tissues of Arctic char residing in the upper part of the Deception River. Metals of concern, such as mercury, lead, and arsenic, were measured at concentrations considerably lower than those considered problematic for human health. Since the NNP shares similarities with the Raglan mine operation and involves a comparable aquatic environment, the proponent feels that it is plausible to say that the metal levels in the tissues of the Arctic char and lake trout in the Puvirnituq River will not change significantly. The Commission considers it relevant, however, to monitor the tissues of the fish in this river in order to prove the hypothesis that it is still an

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abundant source of excellent-quality food. Furthermore, since it is not always easy for non-specialists to understand the ramifications of bioconcentration, it would also be a good idea to present and explain the monitoring program results in plain language to the people using the territory.

### **Puvirnituk River Water Quality at Puvirnituk Drinking Water Intake**

The Puvirnituk River, which flows over 257 km before reaching Hudson's Bay, crosses Pingualuit National Park, where it is one of the attractions for visitors. It is also the source of drinking water for the village of the same name, which is located at the mouth of the river. The NNP is sited at the head of the river and calls for the discharge of domestic wastewater and treated mine effluent into the Puvirnituk River at different points in its watershed.

In conjunction with the environmental monitoring of the Raglan mine, the quality of the water in a number of rivers in Nunavik was analyzed during the mine's operation. The test results showed that the water samples taken from the Puvirnituk River in September 1997 were of good quality, which was confirmed by the proponent's water sampling test results for this river. The concentrations measured, for the water quality parameters set, met all quality standards. Between 2001 and 2006, the MDDEP's Direction régionale du centre de contrôle environnemental de l'Abitibi-Témiscamingue et du Nord-du-Québec collected data on the quality of the village of Puvirnituk's drinking water twice a month for bacteriological analysis and annually for physicochemical analysis. The small number of tests done on raw untreated water from the river in 2001 indicate that fecal and total coliforms could still be detected. The tests in 2004 also revealed the presence of fecal and total coliforms. The physicochemical analysis results confirmed that the quality of the drinking water from the Puvirnituk River was good.

The sources of impacts are both circumscribed and diffused. Effluents and their impact on the river's water quality are discussed in sections 6.2 and 6.3 on waste rock and tailings management and water management, which cover water quality in the park and at the Puvirnituk village drinking water intake. On the other hand, the problem of diffuse contamination from excavation of borrow pits could in the proponent's opinion be limited by mitigation measures such as the installation of a confinement curtain in the adjacent water body to contain suspended solids (SS). In order to guarantee river quality, the Commission considers that borrow pits should not be excavated within 75 metres of watercourses, with the exception of the esker on the peninsula opposite the Expo mine. Regarding the special measures for mitigating the erosion of road embankments and earthworks in areas with steep slopes, the Commission considers these measures to be acceptable.

With respect to the quality of Puvirnituk's drinking water, the Commission sees the protection of this use as crucial and believes the proponent should devote a great deal of attention to it. Within this context, the Commission considers that everything must be done to maximize the treatment of effluent and therefore protect the quality of the river's water. Mine effluent monitoring plays an important role here but it must be complemented by water monitoring at Puvirnituk itself which is just as rigorous. The Commission notes that the proponent has made firm commitments in the Nunavik Nickel Agreement ratified by Makivik and countersigned on April 9, 2008 by the three most impacted communities, as mentioned in sections 4 and 5 above. It is also important for effective communication to be established between the proponent and the community in order to reassure users and react rapidly in the event of an emergency.

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## **Impacts on Fish and their Habitat**

### **BERM-BRIDGE AT BOMBARDIER LAKE OUTLET**

When the environmental and social impact study was submitted, the original plan was to build a dam on a tributary of the Puvirnituk River northwest of the Expo mine. This dam was intended to create a reservoir to meet the water needs of the industrial complex. Then the proponent looked into the possibility of installing a water intake at Bombardier Lake. Finally, due to the greater economic, technical, and environmental constraints with the construction of a dam west of the Expo site, and to the greater water reserves that would be available with the raising of Bombardier Lake, the second option was decided on. Since the environmental impacts are less significant, the Commission is in agreement with this Bombardier Lake berm-bridge alternative.

The fishing carried out by the proponent's people in Bombardier Lake allowed them to catch many lake trout and Arctic char, which would indicate that the lake offers suitable habitats for these two species. What is more, the lake is deeper than most of those studied in the area, and it offers several winter shelters. The berm-bridge will raise Bombardier Lake slightly – by about 0.75 m. According to the proponent, at the end of winter, due to the water collected during the winter, the lake will be at its natural level (546 m) or slightly higher. The proponent therefore does not anticipate that any spawning grounds will be deprived of water and considers it very unlikely that lake trout and Arctic char spawning areas will be deserted. Furthermore, the proponent has promised to maintain free passage for fish between the Puvirnituk River and Bombardier Lake for most of the summer.

The proponent only foresees a very slight or negligible increase in mercury levels in fish tissues when the water level in Bombardier Lake is raised. This increase will have no significant impact on the consumption of fish by mine workers or the Inuit. In the proponent's opinion, consumption will remain unrestricted.

The Commission is in agreement with the proponent's expectations to do with the sustainability of fish populations and the mercury levels in their tissues. Nevertheless, in order to validate these expectations, the proponent will have to monitor the lake's fish populations to check the extent to which water level fluctuations affect the recruitment of fish species and mercury concentrations in fish tissues. Lastly, when the mining complex is shut down, the proponent must submit its intentions regarding the berm-bridge and have the Commission approve any rehabilitation or dismantling work that may be required.

### **MEQUILLON MINE WASTE ROCK PILE**

The watercourse in the study area where the fish are the most prolific is located north of the Mequillon mine, with an average absolute density of 34 Arctic char per 100 m<sup>2</sup>. This watercourse is very short and it links a chain of small lakes, where large numbers of young char probably originate.

The original project called for the base of the pile to be located only a few metres from the watercourse north of the mine and for only a 3-metre strip to be kept intact between the watercourse and the drainage ditch of the waste rock pile.

The waste rock pile has been optimized however: it has been sited further away from the stream, with a buffer of 100 metres or so now separating them. What is more, the proponent has indicated that additional optimizations will be made during the detail engineering for this mine – relocation of the settling pond further away from the watercourse in particular. The Commission accepts these changes and asks the proponent to submit to it the new settling pond site and all

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other optimizations. In addition, in order to permit good dilution of the final effluent and protect the potential spawning grounds identified in lake No. 3, the proponent will have to move the effluent discharge point from the Mequillon mine settling pond to the lake outlet.

### **Impacts on Terrestrial and Avian Fauna**

During the public hearings, Inuit participants raised concerns that their traditional food would be contaminated as a result of the project construction and operation phases. There is not enough literature to allow us to determine the potential impacts of the NNP on caribou tissues. The nutritional quality of caribou flesh is supposed to be more closely linked, however, to the availability of lichen, its primary food source. What is more, the physical condition of the caribou in the Rivière aux Feuilles herd has deteriorated over the past few years, probably due to the increase in the number of individuals and the degradation of the food source as a result of intensive grazing.

The excavation of borrow pits, including eskers, which are often used by Arctic fox to make their dens, could cause den loss for this species. The proponent has promised, however, to make an inventory of Arctic fox dens in all the eskers liable to be excavated during the construction phase. The borrow pits where fox dens are found will either be left alone or only partly used once the pups have left the den. The Commission is in agreement with this mitigation measure and believes that it will greatly limit project-related impacts on this species. Nevertheless, due to the lack of borrow pits near the Expo mine and the large quantities of granular materials required to build the mining complex, the proponent plans to excavate this esker even if a fox den is found there. This impact will be mitigated by the fact that the proponent will have to rehabilitate the esker to create wildlife habitat once it has finished excavating it.

The proponent considers the impact on birds to be low. Although this component is significant, chiefly due to its high ecosystem value and how important waterfowl are to the Inuit, only a limited number of individuals will be impacted by the construction work. What is more, the bird species in the area are typical of those of the Ungava Peninsula. During the operation phase, there will be a loss of nesting and feeding habitat, mostly for waterfowl. Alternative habitats are located near the project, however. Also, the low density of nesting couples in the study area would indicate that intraspecific and interspecific competition is low.

The NNP infrastructures will not affect the feeding habitats of the golden eagle or the peregrine falcon. Furthermore, the proponent will prohibit aircraft flight over the cliffs southwest of Mequillon during the nesting season so as to avoid disturbing raptors with special status. These species should therefore not be affected by the project.

The Commission agrees with the proponent's hypotheses and considers that the NNP's impact on terrestrial and avian fauna will be low.

### **Vahl's Cinquefoil**

There is a colony of about 150 Vahl's cinquefoil (*Potentilla vahliana*) plants, covering an area of a few hundred square metres, at the proposed port facility site. This colony is located within the proponent's planned boundaries for the metal concentrate storage warehouse. Due to the lack of space between the existing road and the shoreline, combined with the inadequate seabed at the other two sites explored for installing the dock, the proponent cannot change the site for this infrastructure.

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Vahl's cinquefoil is endemic to the west coast of Greenland, the Canadian Arctic archipelago, and the adjacent mainland. In Québec, Vahl's cinquefoil is likely to be designated as a threatened or vulnerable species, because it is only found in the Deception Bay area. In and around the NNP study area, three Vahl's cinquefoil colonies were identified by the proponent. Apart from the colony at the planned dock facility site, colonies were discovered in both of the places checked for the species outside of the area potentially affected by port facility construction. It was only observed in typically xeric and exposed sites: coastal gneiss outcrop where the herbaceous stratum covered 30% or less of the surface area. This type of habitat is relatively abundant on the shores of Deception Bay in the area with steeper slopes that begins about one kilometre downstream from the Bombardier beach. The proponent therefore feels that the relative abundance of this plant around Deception Bay could be far greater. There are probably many small colonies scattered over both shores of the bay.

The proponent has committed itself to taking another inventory covering a larger area around Deception Bay in the summer of 2008 to evaluate the abundance of this plant species. All of the colonies found will be mapped precisely in order to ensure their protection during the project construction and operation phases. In addition, the proponent will determine the feasibility of moving some of the plants to a suitable, undisturbed site. The Commission agrees with this approach and would like to be kept informed. It nevertheless understands that it will be difficult, if not impossible, to transplant the colony in question due to the Vahl's cinquefoil root system: taproots extending deeply into rock fissures. With this in mind, the Commission is asking the proponent to study different mitigative, compensatory, and protective measures for the Vahl's cinquefoil colonies inventoried, and to present the measures it decides on. Based on the inventory results, the Commission will rule on whether or not a program should be implemented to monitor this species.

## **6.5 Use of Deception Bay**

For many centuries, the Inuit have hunted seals, which they use for food, clothing, and fuel. They generally hunt in late spring (between mid-March and mid-June), summer, and fall. Seals can only be hunted from boats under 20 m. long, from snowmobiles, or on foot. The area used the most by the Inuit of Salluit for subsistence activities is the Deception Bay shore area. They depend in large part on hunting and fishing for their food. They mostly hunt seals, beluga whales and, less frequently, walruses. Deception Bay is in the northeast part of the hunting and fishing grounds of the village of Salluit. It is primarily used for fishing, seal and beluga hunting, and blue mussel gathering.

In Deception Bay, ice formation starts between the end of October and the beginning of December. According to traditional hunting knowledge, however, for the past few years ice has started to form later – in December – and, more importantly, has thickened more slowly. Maximum ice thickness, which is reached around the end of May, is about 1.7 to 2 metres. The ice begins to melt in June. As with ice formation, climate warming appears to be affecting the thaw period in that it tends to be increasingly early.

As indicated above, the Deception Bay area represents an important source of food for the Inuit of Salluit. When a boat uses the bay during the period when it is frozen over, however, this temporarily compromises access to certain areas because a channel is broken through the ice diagonally from the mouth of the bay to the dock, cutting off hunters from Salluit on snowmobiles. In this case, the only alternative route to the eastern shore of Deception Bay entails a 40 km detour. What is more, boats can alter the natural ice breakup process, causing the annual

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ice cover to thaw and break up earlier. Outside the period when the bay is frozen over, the impacts on traditional Inuit activities are limited to noise and temporary disturbance of wildlife.

Special mitigation measures will be implemented to reduce the impact of boats on traditional Inuit activities in Deception Bay. For example, the boats used by Xstrata and CRI will always take the same route in both directions, namely that taken by Xstrata's boats. This route runs parallel to the shore along the narrowest part of the bay, which makes it possible to keep a large part of the ice cover intact and increases safety, since the Inuit are informed of the route's location. The community of Salluit will be informed ahead of time when a boat is going to break through the ice in order to limit and minimize the potential impacts on hunting and fishing. This program will include instant communication means (satellite telephone), a shipping calendar, and access to a website providing all of this information. The Commission approves these measures.

An increase in marine traffic can affect the ecology of marine mammals by disturbing, degrading or eliminating habitat – beluga feeding grounds, for example, or seal haul-outs where they come ashore. Commercial marine traffic is also associated with high noise levels and held responsible for a large share of the noise pollution presently measured in oceans around the world.

The effects of noise pollution on marine mammals are particularly worrying because these animals depend on sounds to navigate, feed, reproduce, and socialize. The main sources of noise from a ship are the movement of propellers and propulsion machinery. Three key mitigative measures have been proposed to reduce marine traffic noise in Deception Bay. First of all, to the extent that this is possible, the boats used are to be equipped with propellers designed to reduce cavitation in order to minimize air bubbles, which attract marine mammals, and the noise produced to run the boat. Next, maximum speed is to be limited to seven knots, which will reduce the power needed by the boat's motors and cut down noise levels as a result. Lastly, CRI will only make two boat trips during the ice cover period, unless other arrangements are agreed upon in advance with the community of Salluit; this will also decrease noise levels because there is more noise when a boat has to break its passage through icebound waters.

The noise associated with heavy marine traffic is a very real source of disturbance for marine mammals. The increase in marine traffic in Deception Bay will increase the frequency of disruption of the communication and routine activities of marine mammals.

Given the low number of boats that will be using Deception Bay and the fact that their speed will be limited, noise frequency and intensity will be mitigated. What is more, the Inuit who have been using Deception Bay for many years have not noticed any perceptible changes in marine mammal behaviour since port activities were started up again at the beginning of the 1990s. The increase in marine traffic with the NNP will certainly increase the noise level disturbance in Deception Bay, but it will still be well below the levels found in many marine corridors with marine mammal populations. The Commission is therefore of the opinion that the underwater noise impact connected with marine transportation in Deception Bay will not be very significant, even when the expected increase in marine traffic is taken into account.

The construction of port facilities will allow CRI to ship its metal concentrate by boat, which will increase marine traffic in Deception Bay. In addition, some materials and fuel will be brought in by boat during the construction phase. The proponent has committed itself to making sure this has been completed, if at all possible, before the ice cover forms (between June and December). During the first three years of the operation phase, when production will be at a maximum, CRI plans to transport 185,000 tonnes of concentrate in boats with a capacity of

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approximately 25,000 tonnes, depending on availability. Given the changes in marine traffic described in section 6.1, the Commission considers this impact to be very significant.

The extent of this impact on the ecology of marine life and on the Inuit users of the Deception Bay area will be determined by the navigation period chosen, ship speed, and the route taken by the boats used. In the Nunavik Nickel Agreement, CRI promised to adapt to the transportation conditions already established by the Inuit communities and Xstrata, particularly with regard to avoiding the period from the middle of March to the middle of June, which corresponds to the period when the Inuit hunt intensively in the bay area and when seals give birth, and making only three trips when the bay is frozen over (December to June), unless special arrangements have been agreed on beforehand with the Qarqalik Landholding Corporation of Salluit. According to the information in the documents submitted in support of the application, however, this restriction will be somewhat offset by the fact that CRI will use the bay between March and June in the event of an emergency.

When Deception Bay is ice-free, it takes boats about two hours to make the trip from the mouth of the bay to the dock. During the ice cover period, however, it can take up to eight hours or so. Calculating 15 trips a year – including two during the ice cover period, unless special arrangements are negotiated with the community of Salluit – CRI will be responsible for a total of about 110 hours of boat traffic in the bay annually.

The maintenance of marine mammal populations and use of the bay for hunting and fishing and as a means of travelling east of Salluit are among the important points raised by the people of this community during the hearings held there. Within this context, the Commission considers that the mitigation measures proposed by the proponent and harmonized with those adopted by Xstrata are relevant in terms of limiting the cumulative impacts of these two mining projects. All the same, as with its analysis of the project submitted by Xstrata, which was called Falconbridge back then, the Commission reiterates the need to prohibit marine traffic in Deception Bay between mid-March and mid-June. The potential emergencies referred to by the proponent will have to meet the following conditions:

- ◆ The emergency requiring a boat trip between mid-March and mid-June can only be resolved by marine transportation;
- ◆ The urgency of the situation stems from major, unforeseen events at the NNP site;
- ◆ The concentrate storage capacity at Deception Bay is sufficient at all times, alleviating any need to transport the concentrate south by boat between mid-March and mid-June.

Since the mitigative measures already being implemented by Xstrata will be systematically applied by CRI, the impacts of boat use during the ice cover period should be reduced to a minimum. The impact of additional boat use when the bay is frozen over is acceptable under certain conditions.

CRI needs to maintain close communication ties with Xstrata in order to harmonize boat traffic in Deception Bay. They should give each other their calendars to avoid any risk of collision or of two boats meeting face to face because they both chose the same date to use the preferred channel during the ice cover period. Their collaboration could also extend to the maintenance of ice bridges.

Considering that traditional activities will still be possible despite the anticipated increase in traffic in Deception Bay, that the main disruption will be associated with snowmobile access being temporarily cut off between December and the middle of March, and that mitigation

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measures are to be implemented, the impact of marine traffic on traditional Inuit activities is deemed to be acceptable. However, a monitoring program will have to be set up to evaluate the actual impact.

Finally, it is important to remember that the impact of marine activities on Inuit hunting and fishing is going to be partly compensated by a share in NNP spinoffs, as provided for in the Nunavik Nickel Agreement.

## **6.6 Pingualuit National Park**

Pingualuit National Park is Nunavik's first park. It is located south of the NNP, approximately 20 km from the Expo industrial complex. The main objective of the park's creation was to protect the Pingualuit crater, which used to be called the Nouveau-Québec crater. The park also protects countless natural features of the Ungava Plateau region, including part of the Puvirnituq River. Since the planned mining facilities are going to be close to this park, its integrity is an important issue.

### **Pingualuk Lake Water Quality**

Pingualuk Lake is itself a sub-watershed without any apparent outlet that drains under or into the permafrost layer. Its vulnerability to pollution is due to its water replacement time, estimated at 330 years. What is more, since the lake is fed by precipitation alone, it has very cristaline, low-mineral water. In fact, it is one of the clearest lakes in the world, and there are no others like it in Québec. Test results have shown that the quality of the water in Pingualuk Lake did not change between 1955 and 1988: values stayed pretty much the same. This lake is inhabited by an isolated Arctic char population.

The old Asbestos Hill mine is about 60 km north of Pingualuk Lake, and the Raglan mine, about 50 km north. Wind erosion of the waste rock piles, tailings dumps or metal concentrates could have carried dust to Pingualuk Lake and altered the quality of its water. In 2002, Xstrata introduced a program to monitor dust. The findings indicate that dust is mostly deposited near the Raglan mine tailings dump and does not affect the park.

The proponent explained that the NNP will not have any significant effects on the water quality of Pingualuk Lake. First of all, no contaminants can be washed into it from the surface drainage system because it is not fed by any tributaries. According to the proponent's impact modeling, Pingualuk Lake cannot be affected by tailings dust transported by saltation or creep because it is about 34 km away from the Expo industrial complex. What is more, according to the proponent, the problem of wind-blown dust from mine tailings should be minimized because the tailings will be wetter than those produced at the Raglan mine. The proponent's project impact modeling, even after model adjustments, indicates that since Pingualuk Lake is a good distance from the NNP industrial complex, it will only be slightly exposed to wind-borne dust fallout and fine tailings particles.

There are also other NNP activities that are likely to generate dust: machinery traffic on roads, wind erosion of fine waste rock particles from the satellite mines, and blasting inside the extraction pits. The proponent is committed, however, to setting up a program to monitor snow quality and dust dispersion in the tailings dump area. A number of sampling sites (dust jars and/or snow sampling) will be set up around the tailings dump, but also in the Pingualuk Lake area. In addition, the sampling program will call for the harvesting of lichen to evaluate metal content. The proponent will apply to the authorities of Pingualuit National Park for authorization

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before it implements the monitoring program and will also consult them regarding the program's long-term objectives.

### **Puvirnituk River Water Quality**

The Puvirnituk River, after flowing 13 km downstream from the discharge point of the final effluent from the Expo mining complex, enters Pingualuit National Park and crosses it for almost 40 km. Park users are allowed to fish in the Puvirnituk River and it is also very likely that they get their water from it as well.

The quality of the water in the Puvirnituk River within park boundaries is likely to be affected by activities connected with roads and airstrips, the Mesamax and Expo mines, and the Expo industrial complex. The Mequillon and Ivakkak mines are not likely to affect the river's water quality inside the park's limits because the water bodies that will receive the mining effluent empty into the Puvirnituk River downstream from the park boundaries. The Commission believes that the water quality inside the park needs to be monitored and incorporated with the provisions covered in section 6.3.

### **NNP-Related Impacts**

The Puvirnituk River corridor is one of the three landscape units chosen for Pingualuit National Park. A hiking trail runs along the river canyon on the south shore of the river. The shortest distance between potential park users on this trail and the NNP Ivakkak mine is 7.5 km. The trail is 26 km from the Expo industrial complex.

During the construction phase, the sources of potential impacts on the landscape will be building sites and storage areas. The proponent is not planning on any special mitigation measures because this work will be temporary. It also points out that the building sites and storage areas are far enough away not to be visible from any Pingualuit National Park site.

During the operation phase, the source of potential impacts on the landscape is linked to the presence of the mining infrastructures. In order to facilitate the visual incorporation of waste rock piles into the surrounding landscape, they will be shaped like rocky hills and of similar height. Since park users will not be able to see these piles due to the existing topography and the distance, the proponent does not plan to apply any special mitigation measures. It should be noted that the proponent conducted further impact modeling of the Ivakkak mine waste rock pile's visibility with the observer's position moved to a higher altitude on the trail. According to the results, the mining facility will not be visible from this point due to a hill between the trail and the Ivakkak mine and their different altitudes.

Mining infrastructure lighting could also have an impact on the NNP's visibility from Pingualuit National Park. According to the proponent, it is unlikely that light perception will be significant since the industrial complex will be about 20 km from the park. It has nevertheless promised to install sodium floodlights so as to limit dispersion of light around the mining complex. It is the Commission's opinion that this initiative should include the project construction phase as well.

Lastly, the proponent indicates that intermittent dust emissions from different sources will be rapidly diluted in the air and will not be perceived as far away as the park. The pale smoke from the incinerator, composed almost entirely of carbon dioxide (CO<sub>2</sub>) and water, could be perceptible up to a distance of 10 km on a clear day when the incinerator is in operation (about an hour a day). Incinerator smoke should therefore not be visible from the trail.

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The view points closest to the trail on the south shore of the Puvirnituk River in Pingualuit National Park are 7.5 km from the Ivakkak mine, 9 km from the Mequillon mine, and 26 km from the Expo industrial complex. With these distances, the proponent does not anticipate that any noise will be perceived by park users.

Planes or helicopters bringing in supplies, materials, or staff could disturb park users. This impact will be minimal, however, since only about two flights are estimated per week. Helicopter flights within Pingualuit National Park boundaries will be limited to environmental monitoring and must be authorized by park authorities.

The Commission considers that the project's impacts on visitors to Pingualuit National Park will be fairly insignificant subsequent to implementation of mitigation measures. Various monitoring programs will make it possible to confirm or refute the anticipated extent of the impacts.

### **6.7 Shutdown, Restoration, and Decommissioning**

At the Expo site, the restoration of the mine tailings dump is based on a gradual approach. The dump is composed of cells designed to contain paste tailings, and these tailings will be covered by an impermeable membrane. This covering is supposed to be installed gradually as each cell is closed in order to ensure that the dump is airtight and watertight.

At the end of operations at the Mequillon and Mesamax satellite mine sites, the proponent is planning to install low-permeability covers on the top and sides of the waste rock piles. In the case of Ivakkak, the proponent does not anticipate covering the waste rock there because it says that it is not leachable or subject to AMD. In all three cases, the seepage pits will be maintained after the shutdown and will direct seepage and runoff water to the individual settling tanks.

Due to the nature of the project, it could be forced to shut down temporarily for fairly lengthy periods at a time because of outside factors beyond the proponent's control. The Commission is of the opinion that certain environmental activities should be kept up and the Inuit communities informed of the situation during periods such as these.

When the mining operation is shut down permanently, the proponent plans to stop pumping water from the pits and let it sink naturally. The proponent expects each pit to fill up to the low pit edge point and, in each case, plans to direct this overflow to the respective settling ponds. It also anticipates monthly monitoring of the water quality in these ponds during ice-free periods for at least five years.

Since restoration and decommissioning are important components of the project in that they finalize the rehabilitation work at the different sites, the Commission considers that the proponent must submit to it the five-year restoration plans it prepares pursuant to the *Mining Act* (R.S.Q., chapter M-13.1) for its comments and for its ruling on the final restoration plans.

### **6.8 Conclusion**

Based on its analysis of the anticipated environmental and social impacts, and considering the mitigative and compensatory measures in place, the Commission deems the Nunavik Nickel Project, as it is described in the supporting documents submitted with the application for authorization, to be acceptable at the environmental level. The Commission notes that this project has been generally designed to take important environmental issues specific to Nunavik into account and that it offers technical guarantees of effective environmental protection. The proponent has undertaken the commitment to implement mitigative and compensatory measures

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as well as monitoring programs, which will be provided for in an environmental management plan.

However, beyond the specific social protection requirements that the Commission has covered in this report, it is still concerned about the mining boom and its consequences in this part of Québec. The Nunavik Nickel Project will be coming into play in a context where the existing mining operations of Xstrata already go back thirteen years. What is more, as mentioned above, Xstrata will continue to expand in keeping with its mineral resource discoveries and the price of metals. Within this context, it is reasonable to say that mineral development will keep growing, as new actors appear on the stage – with their own transportation and supply requirements and, needless to say, occupation of the territory that will change the environment and way of life of those inhabiting it.

During the public hearings, the Commission noted that mining development is prompting very divided feelings in the most directly affected communities, and that people often have the impression that this is an either/or matter: the traditional way of life versus personal and collective enrichment. The signing of agreements such as the Nunavik Nickel Agreement is of course an important tool for the territory's economic development. However, the Commission considers that a great deal of work remains to be done to bring these two worlds – mining companies and Inuit society – closer together. The ties created so far are fragile and sometimes conflictual. It is therefore important for all political and administrative actors to integrate mineral development, which is by its very nature temporary, into a more general vision of territory planning and development. Only with concerted action, planned with the long term in mind, can impacts on the Inuit's environment and way of life truly be minimized, and the vocations of conservation, through the creation of large national parks, and development, through the mining industry, remain compatible.

In the course of these same hearings, the Commission also noted an overall lack of communication and information directed at the ordinary people in the communities affected by the project. The efforts made so far, although praiseworthy, have obviously not reached their mark. The result is mutual misunderstanding, and a certain amount of frustration on the part of community members. Faced with this state of affairs, the Commission has of course demanded that CRI take additional steps since its function and its mandate limit the scope of its analysis to the NNP. Here too, however, it is urgent for political and administrative authorities to take part in communication efforts so that the communities concerned by the project do not feel powerless when confronted with the upheaval and disruption caused by mineral development, on top of all the other problems the Inuit of Nunavik are experiencing.

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## DECISION AND CONDITIONS

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Based on its analysis of the documents submitted by the proponent and on the public consultations:

**The Kativik Environmental Quality Commission has decided that the Nunavik Nickel Project should be authorized. The Commission cannot, however, authorize the construction of the new airstrip called for by the project.**

This decision relates to the project presented in the environmental and social impact study for the Raglan South Nickel Project, and in the additional information complementing the study. Any change or addition to the authorized project must be submitted to the Commission for its decision.

This decision is subject to compliance with all of the conditions set out in this document and listed below in the order the topics are dealt with in the Commission's report.

**Condition 1:** This decision is valid provided that the main work related to access infrastructure and starting up mining operations, including construction of the mill, is completed within five years of the date of this project's authorization by the Ministère du Développement durable, de l'Environnement et des Parcs.

### SOCIAL ACCEPTABILITY:

**Condition 2:** The proponent must develop an information program for the citizens of Salluit, Kangiqsujuaq and Puvirnituk, and submit it for approval to the administrator referred to in Section 23 of the *James Bay and Northern Quebec Agreement* (referred to hereinafter as the administrator), no later than six months after the project's authorization. This program should enable the proponent to reach as many people as possible directly in order to explain the nature of the mining operations, the precautions adopted to protect the environment, and the corrective measures that will be used to resolve problems experienced by the territory's users. Specifically, the proponent must cover water quality in the Puvirnituk River, fish tissue quality, dust raised by trucks transporting ore concentrate from the Raglan mine to Deception Bay, etc.

**Condition 3:** The proponent has to present a plan evaluating how the project is perceived by territory users to the administrator, for approval, within one year of the project's authorization. This plan should also make it possible to determine the effectiveness of the methods used to communicate the results of the different monitoring programs, and to receive NNP-related complaints from territory users. The evaluation results should be sent, for information, with the complaints attached.

### NUNAVIK NICKEL AGREEMENT:

**Condition 4:** The proponent must submit a report on the Inuit training program to the administrator annually, for information. This report must specify the number of

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people who have been trained in the different classes of employment offered and describe the type of job held by these people.

#### **OVERLAPPING INFRASTRUCTURES:**

- Condition 5:** Before starting on the dredging, the proponent must present to the administrator, for authorization, the disposal site and management method it has chosen for sediment dredged at the Deception Bay port facilities site.
- Condition 6:** With respect to the management of residual material, before the infrastructure is set up, the proponent will present the sites chosen to the administrator, for authorization. The proponent will have to study and submit potential joint operations with Xstrata – Raglan Mine for sites already in operation, explaining the advantages and disadvantages, as well as the sites it has decided on, specifying their advantages and disadvantages. The proponent must also send the administrator an annual report on the amount of bulk metal sent back south from vehicles, equipment and machinery which are outdated or no longer working, comparing it with the amount left on site.
- Condition 7:** The proponent must check the concentration of contaminants and other particles released into the environment by the incinerator six months after it goes into operation, and every five years after that. This data is to be sent to the administrator for information.
- Condition 8:** To solve the road dust problem, the proponent will choose the appropriate dust suppressant in cooperation with the Direction régionale de l'analyse et de l'expertise de l'Abitibi-Témiscamingue et du Nord-du-Québec, Ministère du Développement durable, de l'Environnement et des Parcs.

#### **WASTE MANAGEMENT:**

- Condition 9:** The proponent must submit to the administrator for approval, within one year of the project's authorization, a waste rock representative sampling program designed for in situ verification of the actual increase of AMD (acid mine drainage) risk. The program should include a description of the temporary and permanent control and mitigation measures to be applied if acid generation turns out to be higher than anticipated, such as additional protective measures that could be applied to waste rock piles and tailings dump cells and dikes before they are covered up for good.
- Condition 10:** The proponent has to submit to the administrator for approval, within one year of the project's authorization, a program for monitoring the behaviour of tailings when they are deposited in the tailings dump. This program should focus on segregation according to particle size, dryness, vulnerability to wind erosion, and tailings behaviour when waste rock is layered. It should also take into consideration such phenomena as freezing/thawing, potential granulometric segregation, and preferential ice lens formation flow that could interfere with their behaviour. The proponent will take the results of this monitoring program into account when depositing tailings after that.
- Condition 11:** Before the Expo pit is used for tailings management, the proponent must submit to the administrator, for approval, the arrangements to be made for overseeing this
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use and monitoring water level changes in the pit, in order to ensure that the sinking of mine tailings is an effective short- and long-term measure for preventing acid mine drainage.

#### **MINE SITE WATER MANAGEMENT:**

**Condition 12:** So that the effects of industrial effluent in the river at the Expo site can be documented, the proponent has to submit to the administrator for approval, within one year of the project's authorization, a program for monitoring temperature in situ so as to detect any eventual changes in temperature patterns.

**Condition 13:** In order to evaluate the impact of mine discharge into the environment, the proponent must present to the administrator for approval, no later than one year after the project's authorization, a program for monitoring the receiving environment. This program should make it possible to validate the hypotheses defined with regard to meeting environmental discharge objectives (EDOs). If these objectives have still not been reached after five years, the proponent must present to the administrator for approval the means it plans to employ to meet them, considering the technologies available and the results obtained from the analysis of effluent on-site and of the receiving environment.

#### **IMPACTS ON RECEIVING ENVIRONMENT:**

**Condition 14:** The proponent has to present to the administrator for approval, within one year of the project's authorization, a program for monitoring metal concentrations in the tissues of fish from Puvirnituk River. This program must include at least two monitoring sites in the river, one immediately downstream from the Expo industrial complex effluent discharge point and the other inside Pingualuit National Park boundaries. The proponent must also meet with territory users in order to determine whether other watercourses should be incorporated into this monitoring program. In addition, the proponent must show how it plans to disseminate its findings to the populations using the territory.

**Condition 15:** The proponent shall inform the administrator of the annual sport fishing results of mine employees.

**Condition 16:** The proponent has to submit to the administrator for approval, no later than six months after the project's authorization, a program for monitoring the water quality of Puvirnituk River at the Puvirnituk village water intake and within the boundaries of Pingualuit National Park. The program must include a communications plan for reassuring the population and reacting rapidly in the event of an emergency.

**Condition 17:** All borrow pits must have a 75 m. buffer along watercourses, except for the esker on the peninsula opposite the Expo mine, which could be excavated. To gain access to this site, the proponent will have to build one or more permanent crossings that comply with the requirements provided for in the *Regulation respecting standards of forest management for forests in the domain of the state* (R.S.Q., c. F-4.1, r. 1.001.1) with regard to encroachment on fish habitat and free passage. It must also introduce appropriate measures to limit the amount of suspended solids discharged into watercourses.

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**Condition 18:** The proponent must present to the administrator for approval, within six months of the project's authorization, a program for monitoring changes in mercury levels in the tissues of the fish in Bombardier Lake. This program should include a reference state of mercury levels in the lake.

**Condition 19:** The proponent will have to submit to the administrator for approval, no later than one year after the project's authorization, a Bombardier Lake fish populations monitoring program. This program must allow the proponent to validate predictions regarding the extent of water level fluctuations in the lake during the Nunavik Nickel Project construction and mining phases. It should include fisheries that make it possible to ensure that the rise in the lake's water level and the winter water intake will not have any effect on the recruitment of species already present.

**Condition 20:** Before beginning work at the Mequillon mine, the proponent must present, for the administrator's approval, the new settling pond site and any other project optimizations likely to affect fish populations in the area.

**Condition 21:** Should the proponent shut down operations permanently, it must present its intentions regarding the berm-bridge to the administrator and have any work that might be necessary approved.

**Condition 22:** The proponent will have to move the effluent discharge point for the Mequillon mine settling pond to the lake outlet.

**Condition 23:** Once it has finished excavating the esker on the peninsula opposite the Expo mine, the proponent must submit to the administrator, for approval, a rehabilitation plan to create terrestrial and avian habitat.

**Condition 24:** The proponent must study different mitigative, compensatory, and protective measures for the Vahl's cinquefoil colonies it identifies during its summer 2008 inventory around Deception Bay. It will define the measures it has decided on and present to the administrator for approval, within one year of the project's authorization, a program for monitoring this species in the Deception Bay area. Furthermore, it will evaluate the feasibility of moving a number of plants to a suitable unimpacted habitat.

#### **USE OF DECEPTION BAY:**

**Condition 25:** The proponent must submit to the administrator for approval, within one year of the project's authorization, a program for annually monitoring the impacts of the increase in marine traffic in Deception Bay. This program should target the period when the bay has an ice cover in particular, and emergencies requiring marine traffic between mid-March and mid-June.

**Condition 26:** The concentrate storage capacity at Deception Bay should be sufficient at all times, alleviating any need to transport concentrate south by boat between mid-March and mid-June. The proponent is not allowed to transport anything over Deception Bay during that period, except in the event of a major emergency stemming from unforeseen events which can only be resolved by marine transportation.

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**NATIONAL PINGUALUIT PARK:**

**Condition 27:** The proponent must present to the administrator for approval, no later than six months after the project's authorization, a program for the environmental monitoring of dust propagation around its facilities and at certain sites positioned according to the dominant wind and the receiving environment. This program should enable the proponent to ensure that watercourses in the vicinity are not contaminated by this dust and to verify the project's effects on Pingualuk Lake. The proponent is to apply to the Pingualuit National Park authorities for authorization before implementing the monitoring program. Park management must be informed of the results of the monitoring performed inside the park.

**Condition 28:** The proponent must present to the administrator for approval, within one year of the project's authorization, a program for monitoring the NNP's visual, auditory, and environmental impacts on Pingualuit National Park. It must also, in cooperation with park authorities if possible, set up a system for receiving project-related complaints from park users.

**Condition 29:** The proponent shall present to the administrator, for information, no later than six months after the project's authorization, a plan outlining the measures it intends to put in place right from the start to mitigate project-related light pollution, as well as the results anticipated.

**SHUTDOWN, RESTORATION, AND DECOMMISSIONING:**

**Condition 30:** In the event of temporary shutdown of the mine for less than 18 months, the proponent must abide by its commitment to carry on all monitoring programs until operations are reinstated. If the mine is shut down for over 18 months, the proponent must submit to the administrator the actions it plans to initiate with respect to gradual restoration and the maintenance of environmental monitoring.

**Condition 31:** If the proponent plans to shut down mining operations temporarily, it must inform the communities of Puvirnituq, Salluit and Kangiqsujuaq, as well as the Kativik Regional Government, at least three months in advance.

**Condition 32:** Every five years, the proponent will submit to the administrator, for information, the restoration plan provided for in the *Mining Act* (R.S.Q., chapter M-13.1).

**Condition 33:** One year before the mine is shut down, the proponent must submit for the administrator's approval the decommissioning details for all project-related infrastructures and the restoration plan it intends to use after consulting Inuit populations. This plan should include the receiving environment monitoring program to be used after mining operations are shut down.

**CONCLUSION:**

**Condition 34:** An environmental monitoring report is to be filed annually with the administrator, starting at the end of the first year of the construction phase. This report should cover the progress made, problems encountered in the course of regular operations, and solutions implemented.

**Condition 35:** The proponent must submit to the Administrator, no later than six months after the project's authorization, the environmental management plan that it undertook to

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produce, covering all its commitments in the form of mitigative and compensatory measures and environmental monitoring programs, including those referred to in the conditions above.