



Mine Arnaud

Mine Arnaud Project



Environmental Impact Statement Summary

DECEMBER 2012
PROJECT NO.: 121-17926-00



GENIVAR

ARNAUD MINE PROJECT
ENVIRONMENTAL IMPACT STATEMENT
SUMMARY

Prepared for

Mine Arnaud inc.

By

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LIST OF ACRONYMS

EIS	Environmental Impact Statement
MDDEFP	<i>Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs</i>
MRN	<i>Ministère des Ressources naturelles</i>
MTQ	<i>Ministère des Transports du Québec</i>
MRC	<i>Municipalité régionale de comté</i>
DFO	Department of Fisheries and Oceans
EP	Emergency plan
ZEC	<i>Zone d'exploitation contrôlée</i>

LEXICON

Added value	Remuneration of factors of production within the study area, which include salaries and wages and other gross income (including profits), before taxes.
Apatite	Ore consisting of phosphate, which is one of the three primary components of mineral fertilizers with nitrogen and potassium. Phosphate apatite is also used in the manufacture of detergent, pet food, food and beverage, powder extinguisher, dental products and products for surface treatment of metals.
Concentrate	Substance obtained by the processing of minerals
Concentration	Mining activity consisting to separate useful minerals from waste rock
Deposit	A natural occurrence of a useful mineral, or an ore, in sufficient extent and degree of concentration to invite exploitation
Direct effects	Effects directly attributable to expenses incurred by the project. These are direct jobs during the construction of facilities and the development of the mine, as well as the management and operation of the mine.
Employment or labor	Corresponds to the workload involved in a given project. For example, three seasonal employees who work four months each count as one full time labor equivalent per year.
Extraction	Mining activity consisting to remove minerals from an underground mine or open pit
Indirect effects	Effects resulting from the demand for goods and services generated by the project in other industrial sectors, such as the demand for intermediate goods necessary for the manufacture of a product used in the project. It is thus the effects on suppliers, suppliers' suppliers, etc.
Induced effects	Multiplier effects generated by the project. Project gives rise to an increase in revenues (direct and indirect) and a portion of those revenues return into the economy in the form of new spending on goods and services (consumption expenditure). These new expenditures become income for other economic agents who, in turn, use a portion for new spending, and so on.
Mining title	Mineral right that gives its holder the exclusive right to search for mineral substances in the public domain.
Ore	Rocky mass containing sufficient valuable minerals to justify exploitation
Overburden	All materials, including sand, gravel and soil, lying above rock.
Provincial or national economic spinoff	The sum of the direct and indirect effects across the province of Quebec. Accordingly, purchases of goods and services made with suppliers of another Canadian province or state in the United States are considered leakages and their impacts are not included.
Regional economic spinoff	The sum of the direct and indirect effects at the scale of the North Shore. Thus, purchases of goods and services from another region or outside of Quebec are considered leakages and their impacts are not included.
Restoration	Process by which the terrains disturbed by mining activities are modified to allow new land uses.
Salaries and wages	Correspond to wages before any deductions and income for workers. By assumption, the wages paid in Quebec will be given to residents of Quebec.
Tailings	The gangue and other refuse material resulting from the washing, concentration or treatment of ground ore

Tailings site	Place where mineral substances rejected by the concentration process are accumulated.
Tax and incidental tax revenues	The sum of tax and incidental tax revenues of the Quebec and federal governments. These revenues include revenues from indirect taxes (GST and QST), the taxes on salaries and wages, as well as special taxes related to each level of government.
Titaniferous magnetite	Titaniferous magnetite is a mineral often associated with apatite deposits. During the step of concentration of apatite, titaniferous magnetite is separated; it is thus a by-product. Titaniferous magnetite contains base metals such as iron and titanium, which are used to create particular steels and alloys. Titanium is particularly desirable because it is a white pigment.
Waste rock	Barren or submarginal rock or ore that has been mined, but is not of sufficient value to warrant treatment and is therefore removed ahead of the milling processes.
Waste rock dump	Pile of waste rock produced by the operation of a Mine.

1. INTRODUCTION

This summary presents in an accessible format the main elements of the Environmental Impact Statement (EIS) of the Arnaud mining project (Roche Ltd., 2012¹) as well as the process and activities of public consultation during the realization of the EIS and after submission to the *Ministère du Développement durable, de l'Environnement et des Parcs* (MDDEP)² and the Canadian Environmental Assessment Agency (CEAA).

Note that after the examination of the EIS, government authorities and interested parties raised various questions and made comments. This process is a normal part of the stages of an environmental assessment. To answer some of these questions and concerns, additional studies were carried out by Mine Arnaud. These studies are included in this summary, including:

- modeling of atmospheric dispersion of particles;
- water management plan and site drainage during the construction, operation and restoration phases;
- hydrological study;
- optimization of water balance for the life cycle of the mine;
- evaluation of hydrogeological conditions at the tailings site and open pit;
- hydrogeological modeling to quantify the radius of influence of drawdown based on hydraulic conductivity of the rock;
- acoustic modeling;
- additional bird inventories;
- additional fish inventories and characterization and compensation of aquatic habitats;
- study on vegetation (wetlands and special status plants);
- environmental assessment of the project activities at the Port of Sept-Îles;
- study of the determinants of public health at the regional and local levels;
- visual simulations and analysis of project impacts on the landscape, including optimization of project components;
- economic impact of the project;
- analysis of alternatives for mine waste disposal.

1 ROCHE Ltée, GROUPE-CONSEIL. 2012. Projet minier Arnaud – Étude d'impact sur l'environnement. Rapport préparé pour Mine Arnaud. Mars 2012. 3 vol. Pagination multiple.

2 Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (MDDEFP) depuis septembre 2012.

This summary includes an overview of the project in Chapter 2, its context and purpose, regulatory framework and methodology for the assessment of environmental impact. Chapter 3 presents the technical description of the project. Chapter 4 focuses on public participation in the environmental assessment process. In Chapter 5, the portrait of the valued environmental and social components, as well as the evaluation of key impacts on these components, after the implementation of mitigation and compensation plans, are presented. Chapter 6 focuses on the consideration of the principles of sustainable development, while Chapter 7 deals with cumulative effects. Finally, Chapter 8 outlines the environmental and social management of the project as well as technological risks.

The reader is invited to refer to the impact assessment documents for answers to questions of governmental authorities as well as additional studies that accompany the EIS to obtain detailed information on topics of interest.

1.1 Proponent

The proponent of the project is Mine Arnaud Inc. (Mine Arnaud), a wholly owned subsidiary of *Ressources Québec* and Yara International ASA. Its mission is to operate a large deposit of apatite in the Sept-Îles region, respecting local communities, the environment and sustainable development principles.

Subsidiary of *Investissement Québec*, *Ressources Québec* is the entry point for companies wishing to invest in mining and hydrocarbons. *Ressources Québec* includes current government investments of \$ 236 million in the areas of mining and hydrocarbons, including those of SOQUEM and SOQUIP. It will also have an additional capitalization of \$ 250 million for making investments in these sectors.

Yara International ASA is one of the largest producers of fertilizers in the world headquartered in Oslo, Norway. Yara operates thirty factories in 15 countries and employs approximately 7600 workers.

The headquarters of Mine Arnaud are located in Montréal (Québec). Mine Arnaud team has several decades of experience in exploration and mining it has acquired in the course of Canadian projects. Mine Arnaud operations office and community liaison is located at 690 Boulevard Laure Sept-Îles, Place de Ville.

1.2 Overview of the project and location

The Arnaud mine project takes place in the administrative region of the North Shore (Region 09) and the *MRC de Sept-Rivières*³. Mine Arnaud wishes to operate an apatite deposit located within the property, within the limits of the town of Sept-Îles,

³ A portion of the tailing facility is located in the unorganized territory of Lac-Walker.

more precisely in the canton Arnaud. The township includes the hamlet called Canton-Arnaud, established along Highway 138 approximately 15 km (by road) west of downtown Sept-Îles (Map 1). Sept-Îles itself is located about 660 km east of Quebec City and 920 km from Montreal.

The mining property comprises a block of contiguous claims covering an area of 56.5 km². The claims are registered in the name of Mine Arnaud, which holds all the exploration rights of property. The coordinates of the center of the deposit is about 50°15'30" N latitude and 66°30'30" W longitude.

The deposit also touches on several private properties, as well as the Arnaud Railway. Much of the mining property also overlaps the territory of the zec Matimek. In addition, Hydro-Québec high-voltage lines are located between the pit and project infrastructures.

Located to the north of the center of the *Baie des Sept Îles*, the deposit is easily accessible by Highway 138, which is 1 km south of the southern boundary of the pit. There are currently two accesses to the site, the access to the ZEC by the chemin Allard and an existing access to the property of Mine Arnaud.

The project will require the construction of numerous mining infrastructures and related facilities that will be used throughout the operation of the mine. The main project components are:

- a crusher and an ore processing plant with a production capacity of 1.4 million tons of concentrate per year;
- a road to the site from Highway 138;
- an open pit with maximum dimensions of approximately 800 m wide by 3.5 km long and 240 m deep;
- a waste rock dump and a site for temporary storage of crushed ore;
- an accumulation area of low grade ore and three areas of accumulation of overburden, including a screening mound;
- a tailings site composed of several cells for segregation of two types of residues and a gradual restoration;
- a treatment plant for industrial wastewater;
- service buildings (administration, garage, etc.).
- electrical sub-stations for the processing plant and the mine;
- a warehouse for explosive primer and a second for detonators.
- dismantling and relocation of an 8 km portion of the Arnaud Railway;

- facilities for train loading and unloading;
- storage silos of the concentrate conveyor and ship loader at the Port of Sept-Îles;
- relocation of a portion of the snowmobile trail Trans-Québec N° 3.

To house workers during the construction period, Mine Arnaud could build its own worker camp on the site. However, the option that will be favored, if it is available, is to house workers in a camp set up by a private developer. This option is currently being studied by groups in the community. Mine Arnaud also considers building a scalable camp which could eventually be converted into housing.

The operation of the mine is expected to take approximately 23 years with a daily production of about 30 000 t of ore. Average mining production is 23.7 Mt per year (including ore, waste rock and overburden). The concentrate will be transported from the mine to the port of Sept-Îles by railroad at a rate of one train of about 40 cars per day. The concentrate will then be loaded onto ships and transported to a fertilizer plant in Norway. The investment required to bring the project forward is more than \$ 750 million.

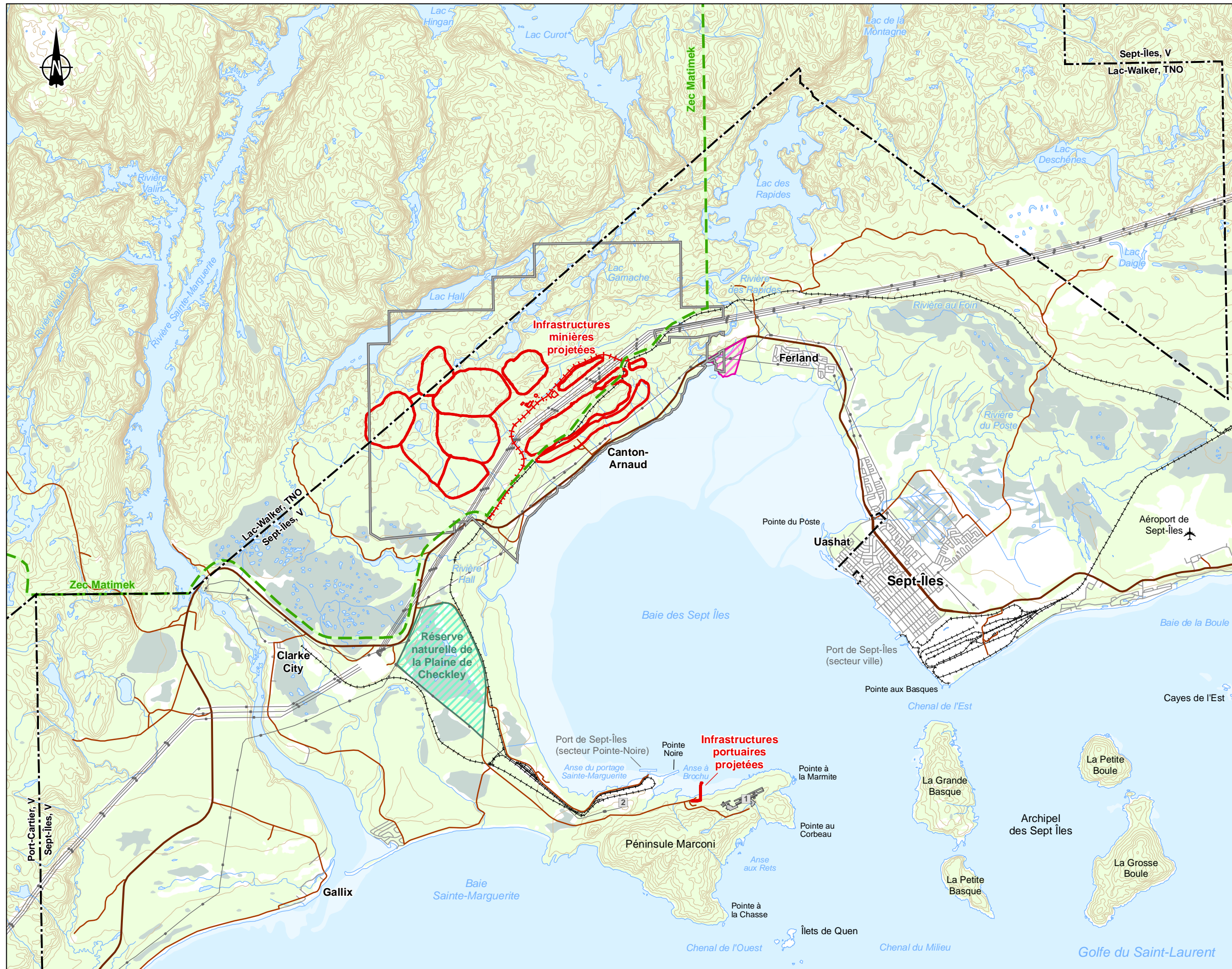
Two types of residues will be produced, the flotation tailings of apatite and tailings from the magnetic separation. The tailings will be pumped into a tailings site located northwest of the facilities and accumulated in separate cells. Although no specific buyer has been identified for the magnetic product, it is expected to accumulate it in a separate area so that it can be recovered easily and valued by a proponent other than Mine Arnaud.

When the mine will be in full production, approximately 330 employees will be required for the proper functioning of operations.

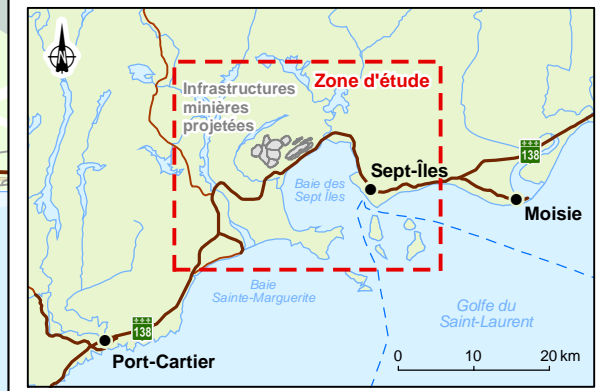
The project will also require a multi-purpose wharf and buildings at the Port of Sept-Îles, in the area of the *Quai de la Relance* (Pointe-Noire), facilities for handling, storage and transfer of up to 1.4 Mt of apatite concentrate per year. The multi-purpose wharf will be built by the *Administration Portuaire de Sept-Îles*. This project will be subject to a separate environmental assessment conducted by the *Administration*.

1.3 Environmental Policy

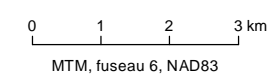
Attention to environmental and sustainable development principles is part of the culture of *Investissement Québec* and Yara International, the two companies forming Mine Arnaud. Therefore, Mine Arnaud has adopted an environmental policy in order to establish its commitments in this regard.



- Infrastructure minière projetée (Mine Arnaud)
- Voie ferrée projetée (Mine Arnaud)
- Claim (Mine Arnaud)
- Milieu humain**
- Route principale
- Route secondaire
- Rue
- Chemin de fer
- Ligne de transport d'énergie
- 1 Aluminerie Alouette
- 2 Cliffs Natural Resources (usine de bouletage)
- Milieu physique**
- Cours d'eau
- Dépôts fluviaux
- Courbe de niveau
- Milieu humide
- Autres**
- Réserve naturelle de la Plaine de Checkley
- Parc Aylmer-Whitton
- Limite de la zec Matimek
- Limite municipale



Carte 1
 Emplacement du projet minier Arnaud



Sources :
 Base : BNDT, 1:50 000, feuillets 22J01, 22J02, 22J07 et 22J08, RNCan, 2007
 Infrastructures minières : EIE, N/Réf. : 059858-600-661, ROCHE, mars 2012
 Fichier : 121_17926_REIE_c1_zetude_121204.mxd

2. PROJECT OVERVIEW

2.1 Background and rationale of the project

2.1.1 Global economy

Demand for apatite is growing rapidly as evidenced by its value which has tripled in the past five years. Several factors contributed to this growth:

- demand for fertilizers in developing countries;
- the low level of grain reserves in the world;
- increased demand for crops for biofuel production;
- the demand for better quality food;
- the closure of several apatite mines;
- rising costs of building new mines.

To meet this growing demand for natural fertilizers and since there are no substitute for phosphorus in agriculture, the annual world production anticipated for 2015 should reach 228 Mt. The global demand promotes the exploitation of apatite in Québec. In addition, the demand for high quality apatite, without any contaminant, is now required by various countries, including the United States and some European countries. The apatite in Sept-Îles meets this criterion of purity.

2.1.2 Local and regional economic context

The apatite deposit is located in the geological formation surrounding the Baie des Sept Îles. The project is an opportunity for economic development as it will diversify the local economy by providing stable and well-paying jobs, independent of cyclical fluctuations in global demand for iron.

During the construction phase, Mine Arnaud believes that the project will require between 800 and 1,000 workers, while during the operational phase, the average annual number of employees is about 330. Mine Arnaud will favor the hiring of workers locally and regionally as well as from the Uashat mak Mani-utenam community.

Mine Arnaud ensures collaboration with the City of Sept-Îles and support its socioeconomic development initiatives. The Arnaud mine project also happens at a time when Sept-Îles, *MRC de Sept-Rivières* and the North Shore experience an economic boom. The project of an apatite mine takes place in an economic environment in which the primary sector already plays an important role and where it is proportionally larger than at the scale of the province of Quebec.

The secondary sector of the economy is also very active. The *MRC de Sept-Rivières* hosts facilities of several major companies - Alouette, Iron Ore Company, Cliffs Natural Resources (Division Wabush Mines) and Arcelor Mittal - who transform mineral resources locally derived primarily from the region. Over the years, a core business of goods and services supplying to the mining sector built up around these mining companies. The area also hosts several companies specializing in the supply of equipment or chemicals to the mining sector. As in other resource regions experiencing a growth in mining, construction has experienced a resurgence during the years 2010-2011 after a few difficult years. The service sector is less developed in the region than in other parts of Québec, but it still provides nearly three-quarters of total employment.

Finally, the project is located within the Plan Nord territory that extends north of the 49th parallel.

2.1.3 Context of project integration

The population of Sept-Îles reached about 26 300 inhabitants. It is the first largest city in the North Shore.

The territory of the Innu communities of Uashat and Mani-Utenam are landlocked within the agglomeration of Sept-Îles. They are grouped under a single Council and a single Band. In 2006, the Sept-Îles census counted 3830 natives. This community is thus one of the most populous bands of Quebec as well as one of the largest Innu communities with those of Mashteuiatsh, Lac-Saint-Jean, and Pessamit (Betsiamites), also on the North Shore.

The mining project is located at the boundary of public and private lands, the boundary between them lying just north-west of the Arnaud railroad.

The land use and occupation are at a low density around the site of the future mine. Large areas are occupied by linear infrastructure (road, railway, forest trails, snowmobile and all-terrain vehicle trails and power lines). Most of the implementation area of the mine is under forest cover. There are also some cabins, hunting camps or rough shelters in the forest north of the railway, and a snowmobile relay. The main types of land use identified along Highway 138 are residential and commercial as well as recreational and leisure activities.

2.1.4 Estimate of exploitable resources Arnaud Mining Project

The evaluation of mineral resources in apatite was performed by RPA in the summer of 2011 and again at the end of the year 2011 by G-Mining. The results of the later evaluation are:

- 251 Mt apatite at an average grade of 5% P₂O₅⁴ ;
- 255 Mt waste rock;
- 50 Mt overburden.

With a total of 556 Mt to extract and a feed rate at the plant of 11.25 Mt apatite per year, the operating life of the deposit is estimated to be around 23 years. The concentrated product is about 1.4 Mt annually.

Currently, Mine Arnaud considers titaniferous magnetite as a mining residue since no economically viable market has been identified so far for this by-product. However, taking into account both environmental and economic benefits, Mine Arnaud wishes to identify a market to allow its utilization by a specialized company.

The apatite deposit would be extracted and concentrated at the processing plant before being sent to Yara in Norway, which would extract the phosphate needed to produce agricultural fertilizers.

2.2 **Regulatory framework**

Due to the capacity of the processing plant (about 30 000 t/d), the mining project is subject to Article 31 of *Loi sur la qualité de l'environnement* (Q-2) and *Règlement sur l'évaluation et l'examen des impacts sur l'environnement* (Q-2., r. 23). The project is also subject to a federal environmental assessment under the Canadian Environmental Assessment Act (CEAA) and requires a comprehensive study.

The EIS provides the information requested by the MDDEFP in the *Directive pour la réalisation de l'étude d'impact sur l'environnement d'un projet d'exploitation d'un gisement d'apatite* sent to Mine Arnaud January 13, 2010 (file 3211-16-006). The study also provides the information required by the Canadian Environmental Assessment for conducting a comprehensive study and specified in the *Lignes directrices pour la réalisation d'une étude d'impact* (issued March 8, 2012). Mine Arnaud agrees to obtain all permits and approvals required in connection with the enforcement of these laws.

⁴ The phosphorus content in the ore is usually expressed as a percentage of phosphorus pentoxide (%P₂O₅).

2.3 Environmental Impact Statement

2.3.1 Scope of the project and assessment

The project scope includes the activities and structures that must be considered in the impact assessment. For the application requirements of the CEEA, the scope of the project generally includes all components of the project submitted by the proponent. Other works, temporary structures or activities directly related to the project are also included in the scope of the project (e.g. temporary access roads, deforestation, cofferdams, embankments, revegetation, etc.). It is reminded that the multi-purpose wharf that will be built by the *Administration portuaire de Sept-Îles* and which will be used by Mine Arnaud for conveying the ore to Norway is not part of the scope of this environmental assessment.

Chapter 3 of this summary presents a description of the project that covers all installations, structures and activities that were considered in the impact assessment and which define the project scope. It covers all phases of the project: construction, operation and closure of the mine.

Directive 019 sur l'industrie minière (April 2005) sets out the requirements that any mine operator must comply, and the information that must be provided to support the request for MDDEFP certificate of authorization.

Environmental components to be analyzed and listed in these guidelines as well as all other requirements have been considered in the impact assessment submitted to the two levels of government and in specialized studies submitted in addition to the EIS.

2.3.2 Time limits

The period of preparation, construction and installation of mine infrastructure will span nearly two years (2013-2015). It is expected that the exploitation of the deposit will continue over a period of approximately 23 years (2015-2038). Activities of mine closure and final restoration of the site should take about two years (2038-2040).

Environmental conditions that were used to determine the current state of physical, biological and human were compiled from information available in the literature and surveys and field inventories conducted mainly between June 2010 and November 2012.

Some components of the environment have been characterized on the basis of data collected over longer periods, especially in regard to the physical components of the environment including climate (temperature, precipitation) and wind.

2.3.3 Spatial boundaries

The study area was delineated to encompass all the planned activities and their direct and indirect effects on the components of natural and human environments which the project and its associated infrastructure may potentially affect. The study area corresponds to the area shown on Map 1. This includes in particular the town of Sept-Îles and Uashat. This particular study area was used for the analysis of project impacts on the human environment.

Within this territory, an area more specific for the analysis of project impacts on the biophysical environment was defined, which extends on about 202 km² (of which almost half are marine waters). This study area is broad enough to encompass the whole area of mining infrastructure and port related facilities and outlying areas. It covers all direct and indirect impacts of the project on the physical and biological components that may be affected by the project. It also covers the area of the *Quai de la Relance* (Pointe-Noire) at the Port of Sept-Îles, where handling facilities, storage and transshipment of apatite concentrate will be conducted by Mine Arnaud.

2.3.4 Environmental assessment methodology

The general methodological approach for the identification and assessment of impacts of the project includes the following main steps:

- identification of sources of impact;
- identification of valued environmental components;
- formation of a grid of interrelations;
- description of impacts;
- determining the significance of the residual impact, taking into account environmental design measures, mitigation, enhancement and compensation.

The identification of interrelations (as well as the analysis and evaluation of the resulting impacts) is performed by a multidisciplinary team that brings together experts from many mining and environmental professions covering all specialties of the physical, biological and human environment and landscape.

Considering the implementation of mitigation and compensation, the significance of residual impacts is then determined using three criteria: the degree of modification (low, medium or high), duration (short, medium or long) and extent (point, local or regional). These three values are combined to assess the importance of impact (low, medium or high).

3. PROJECT DESCRIPTION

3.1 Project Access

Access to the project site is possible via Highway 138 and a 4.5 km access road to be built. Two access alternatives were studied. The first alternative provides an entrance on the west side of the mine site from Highway 138 approximately 1 km east of the bridge over *Rivière Hall*. Given the concerns expressed by the public in relation to road traffic in Canton Arnaud, an alternative to the east, with a greater distance, was also analyzed by Mine Arnaud. For mainly economic reasons, the west alternative was finally adopted (Map 2).

3.2 Siting project Infrastructure

The deposit involves the construction of infrastructure and mining facilities near it while considering various constraints. These include in particular the visual potential for the residents, topography, drainage, unstable areas in a geotechnical perspective, wetlands, the presence of sensitive wildlife habitats, the technical parameters of operation and mining, areas used by the population, considerations of health, safety and risk management, etc. Taking into account all these constraints, combined with the desire to minimize the project footprint on the natural environment and optimize operations, significantly reduces the number of sites where these facilities can be constructed.

It should be noted that the positioning of mining infrastructure north of energy transmission lines by Mine Arnaud is a decision after meeting with residents of the area surrounding Highway 138. They expressed a desire not to see the mining facilities from their home and not hear the noise from the operations of the mine. Mine Arnaud has taken into account these comments to locate its facilities.

The siting of infrastructure takes into account all the constraints mentioned above. Also, it aims to minimize the footprint of facilities while being safe with respect to the required distances between the various buildings of the mining complex.

The tailings site has also been positioned according to the results of analysis of different alternatives. Despite the presence of waterbodies in the study area of the project, it could be positioned so as to limit encroachment on fish habitat and reduce the number of sub-watersheds affected. In addition, it has been designed in accordance with the criteria of geotechnical stability while minimizing its size and its maximum height so that they are aligned with the contours of the surrounding hills. A screening mound is planned south of the pit in order to limit the visibility and reduce the noise impact of the overall operation of the mine.

The waste rock dump and accumulation areas of overburden will be placed near the pit to limit the transport of equipment and facilitate the reuse of materials. These areas of accumulation were optimized to reduce the footprint while maintaining acceptable heights.

The locations selected for roads on the site are intended to ensure the smooth and safe traffic and the safety of workers, while reducing the risk of environmental contamination. Moreover, the presence of till and marine deposits on most of the mine site reduces the vulnerability of the territory contamination of groundwater as a result of a potential spill.

Finally, mining facilities and the processing plant and were positioned according to the progression of technical requirements of the project and the mine plan. The water accumulation basin, which will contain large volumes of water from runoff and dewatering the pit, has been positioned to the east of the east flotation tailings cell.

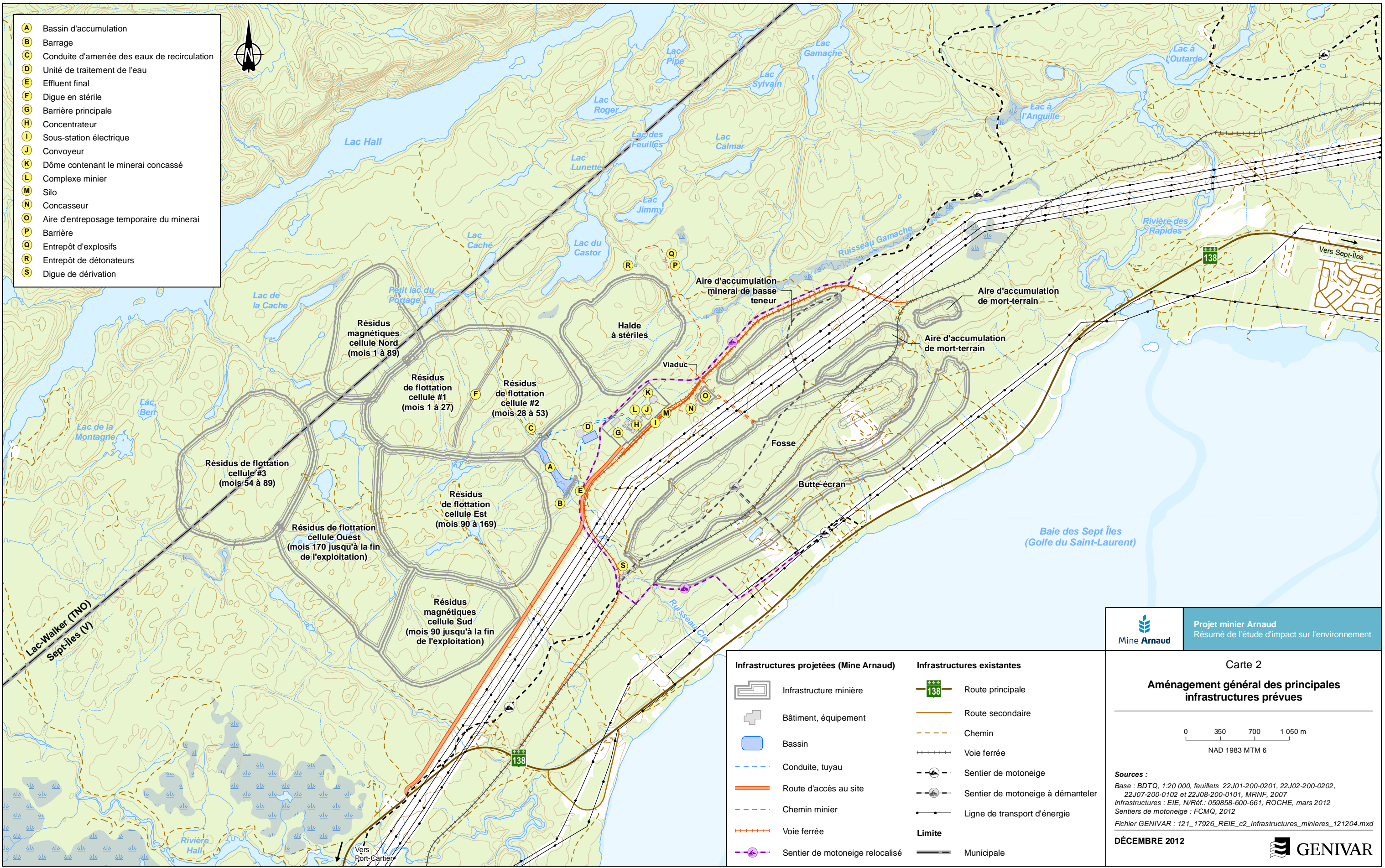
3.3 Alternatives considered

Alternatives of different components of the project were first defined and then analyzed by considering environmental, technical, economic and human criteria. This alternative analysis retains those with the best balance between these criteria and which minimized the potential impact on the environment. The definition and analysis of alternatives focused on the following aspects of the project:

- siting mining infrastructure;
- tailings disposal;
- access to the mine site;
- mode of transportation of the concentrate;
- water supply;
- relocation of the snowmobile trail.

Also to meet the environmental guidelines of the project, an alternative "without project" was analyzed. It was found that this alternative would cause direct as well as indirect impacts on the economic development of the project area.

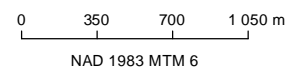
Alternatives analyses are presented in detail in Chapter 4 of the EIS and in additional studies accompanying the main report. The tailings site has been the subject of a separate study in line with the requirements of Environment Canada.



- A** Bassin d'accumulation
- B** Barrage
- C** Conduite d'amènée des eaux de recirculation
- D** Unité de traitement de l'eau
- E** Effluent final
- F** Digue en stérile
- G** Barrière principale
- H** Concentrateur
- I** Sous-station électrique
- J** Convoyeur
- K** Dôme contenant le minerai concassé
- L** Complexe minier
- M** Silo
- N** Concasseur
- O** Aire d'entreposage temporaire du minerai
- P** Barrière
- Q** Entrepôt d'explosifs
- R** Entrepôt de détonateurs
- S** Digue de dérivation



Carte 2
Aménagement général des principales infrastructures prévues



Sources :
 Base : BDTQ, 1:20 000, feuillets 22J01-200-0201, 22J02-200-0202, 22J07-200-0102 et 22J08-200-0101, MRNF, 2007
 Infrastructures : EIE, N/Réf.: 059858-600-661, ROCHE, mars 2012
 Sentiers de motoneige : FCMQ, 2012
 Fichier GENIVAR : 121_17926_REIE_c2_infrastructures_minieres_121204.mxd

- | Infrastructures projetées (Mine Arnaud) | Infrastructures existantes |
|---|-----------------------------------|
| Infrastructure minière | Route principale |
| Bâtiment, équipement | Route secondaire |
| Bassin | Chemin |
| Conduite, tuyau | Voie ferrée |
| Route d'accès au site | Sentier de motoneige |
| Chemin minier | Sentier de motoneige à démanteler |
| Voie ferrée | Ligne de transport d'énergie |
| Sentier de motoneige relocalisé | Limite |
| | Municipale |

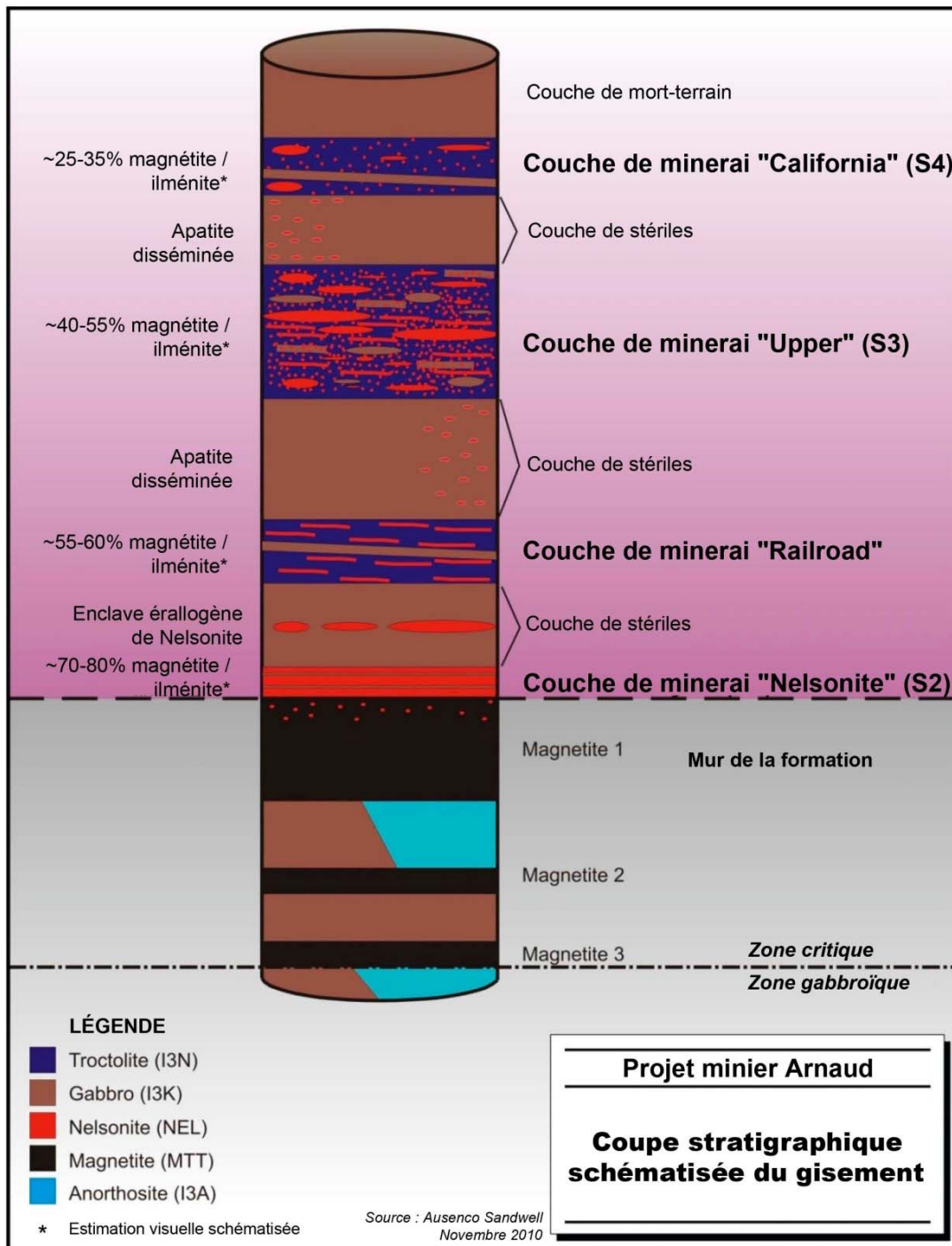


Figure 1 Stratigraphic section of the deposit

3.4 Background and geological description of the deposit

The Mine Arnaud property lies entirely within the Igneous Complex of Sept-Îles (layered mafic complex), part of the Grenville geological province. The deposit is located in the northwest portion of the complex consisting of several layers with different characteristics. The stratigraphic section of the deposit is shown in Figure 1.

The complex has the form of a basin about 80 km in diameter, mostly located in the Gulf of St. Lawrence. Only its northernmost part lies flush with the bed of the *Baie des Sept Îles*.

Only apatite (phosphorus) has been considered in the feasibility study of the project. Nevertheless, the deposit also includes magnetite and ilmenite that are potentially marketable. The area of apatite considered economically exploitable requires a pit 800 m wide and 3 500 m long with a depth of up to 150 m below sea level and a maximum depth of 240 m from the uppermost surface. The elevation at the footprint of the pit varies between 30 m and 100 m. The deposit continues at depth. However, the mining plan does not consider this deep resource for economic reasons.

3.5 Mining Plan

The mining plan is established to meet:

- the capacity of the processing plant;
- minimization of operating costs;
- maximizing the content;
- stabilization of the concentrated product with respect to its quantity and quality.

The extraction of overburden and waste rock in the pit could begin in 2014 to provide the materials needed for construction. At the beginning of the operational phase in 2016, mine production by surface mining begins on the north side of a width of more than 1 km and progresses southward.

The plant will begin production more than a year and a half later, which will allow producing the volumes of rock required for surface preparation, on-site facilities, access roads and dikes of the tailings site. The ore excavated during this period will be stored in front of the crusher and will be used to start production. Low grade ore will, in turn, be stored on a separate pile to the east of the ore pile. Part of the overburden will be stockpiled on the south side of the pit to create a screening mound and thus decrease the noise and visual impact. The screening mound will also be constructed in part with waste rock. The excess overburden will be piled to the east, taking care not to hamper the future resource potential in this area. It is important to note that the stripping of overburden will be conducted over a period of about 12 years. Part of the overburden can be used to restore gradual slopes of the tailings site and waste rock dump, thereby reducing the amount of material that must be accumulated.

During pre-production, about 2 Mt of waste rock will be excavated. The current plan foresees one year and a half of pre-production, followed by six months of production at 75 % of the nominal capacity of the plant. During months 7 to 18, the plant will operate at 90 % capacity and then operate at 100 % until the end of operations.

3.6 Mining and related facilities

The layout of the main facilities on the project site is shown in Map 2. Infrastructure and facilities project are described in detail in Chapter 5 of the EIS.

The main installations that will be required for the operation of the mine include the elements described in section 1.2 of this summary.

For the purposes of the environmental assessment, the various facilities, their construction and operation were grouped into various sources of project impact. These sources of impact will occur during the different phases of the project, that is construction (Co), operating (Op) and closure (Cl). These sources are the following:

- preparation and site development (clearing, grubbing, blasting, filling, excavation, drainage - all facilities) (Co and Op);
- use and maintenance of machinery (Co, Op and Cl);
- water management (water supply, recirculation, runoff, drainage, wastewater, drinking water) (Co, Op, Cl);
- management of hazardous materials, fuel and waste (Co, Op and Cl);
- labor, supply and road traffic (Co, Op and Cl);
- extraction, handling, storage and processing of ore (Op);
- transportation of the concentrate (Op);
- construction and presence of infrastructure and buildings (Co and Op);
- site restoration (Op and Cl);
- dismantling and recovery facility (Cl).

3.7 Supply

Procurement for the proposed Mine Arnaud includes the purchase of goods and services for the construction, operation and closure of the mine site.

Purchase of materials and equipment early in the project will be used on one hand to build the mine site and secondly for its operation. During operation, the goods will be mainly delivered by truck to the mine site by a steady delivery stream of 10 to 15 truck trips per day for the 23 year duration of the operation.

The railway line will be relocated near the concentrator. At this point, a detour route will be constructed for the needs of the project. Transport of apatite to the port of Sept-Îles will be provided by Wabush Mine. Loading the apatite will take place at a loading station where two silos of 4500 t capacity will be built over the railway deviation. Transportation between the site and Pointe-Noire will require a daily convoy of about 40 cars. It is anticipated that the train will operate about 330 days per year.

Lime will be delivered by truck and transferred via a pneumatic system to a 60 t vertical silo.

3.8 Construction Plan

Mine Arnaud expects to complete the project according to the following schedule:

Pre-construction

This phase aims to obtain all necessary authorizations to allow the start of construction in 2014. Planned activities during this period include:

- additional studies on geotechnical, hydrogeology, mineralogy;
- examination of the EIS by government authorities;
- exchanges and consultation with stakeholders;
- consultation of the Canadian Environmental Assessment Agency;
- public hearing process of the *Bureau d'audiences publiques sur l'environnement (BAPE)*;
- agreement with Cliffs Natural Resources (which operates a pellet plant in Pointe-Noire) for the construction of the new section of track and the dismantling of the current section;
- agreement with the *Administration portuaire de Sept-Îles* for the use of a multi-purpose wharf for buildings and infrastructure at the port;
- detailed engineering and preparation of tenders.

Construction (2 years)

During the construction phase, some activities will be completed by third parties. Thus, a new wharf will be built by the Port of Sept-Îles and Hydro-Québec will connect to the 161 kV line from the Arnaud substation and a connection to the 25 kV line to the port. Also, the new section of track will be built. This will be done by Arnaud Railway or Mine Arnaud, under the supervision of Railway Arnaud.

Upon governmental approval, the plant site will be cleared and stripped to allow blasting and surface preparation. Stripping and blasting the northwestern part of the pit will be made as soon as possible to avoid impact on the construction of the La Romaine high voltage line corridor which is located nearby. Clearing and stripping of the site of the crusher will also be made as soon as possible. Deforestation areas planned for the first flotation and magnetic tailings cells, the waste rock dump, the ore storage area, and the overburden piles will be made at the beginning of the construction period.

Operation (23 years)

According to the mining plan, the production phase begins after two years of construction. The operation of the mine will yield about 11 Mt of ore per year for 23 years.

Volumes of waste rock generated will vary in time, as follows:

- 8 Mt per year on average for the first 10 years
- 18 Mt per year for 7 years
- 7 Mt in the last years of operation.

The excavation of overburden will be phased in over a period of 12 years. It will be directly reused for various revegetation sites.

Tailings cells will be built gradually. Progressive restoration after filling should start from the fourth or fifth year of operation.

3.9 Implementation schedule and staffing needs

3.9.1 Construction

During the construction period, between 800 and 1,000 workers will be hired. There could be up to 500 workers on site at the same time.

These construction workers will travel between the mine site and where they will be accommodated. The nature and extent of the implications of this additional traffic, morning and evening, on Highway 138 will depend on where the workers will be accommodated and the organization of transportation (individual vehicles, carpooling, shuttle, etc.). It is projected that a work camp will be built either by a private developer (at a site to be determined) or by Mine Arnaud (on the project site). Regardless of the option chosen for the accommodation of workers during construction, measures shall be prescribed to reduce the commuting of workers on Highway 138 in the area of Canton Arnaud.

3.9.2 Operation

In the operational phase, the average number of employees will be about 330 for 23 years (Figure 2). The distribution of employment by service (average 23 years) is shown in Figure 3. Note that jobs related to mining production and maintenance account for nearly two thirds of the total workforce.

During operation, most workers should be housed in Sept-Îles. They should therefore take Highway 138 to get to work. As the numbers will be split into two shifts per day (for a period of 8 or 12 hours depending on the service and positions), all workers will not commute at the same time. An estimated 175 workers (administration and mine) will be moving at day shift and about 160 workers at night shift. Peak traffic should occur over a period of about 40 minutes during shift changes (20 minutes before and 20 minutes after).

3.10 Economic Impacts

An investment of \$ 750 million is expected by Mine Arnaud, excluding the construction of the new dock which will be owned by the authorities of the Port of Sept-Îles. The breakdown of investment costs by sector is as follows:

- mine: \$ 60 million;
- processing plant \$ 250 million;
- infrastructure: \$ 100 million;
- port facilities: \$ 65 million;
- pre-production: \$ 55 million;
- indirect costs: \$ 220 million.

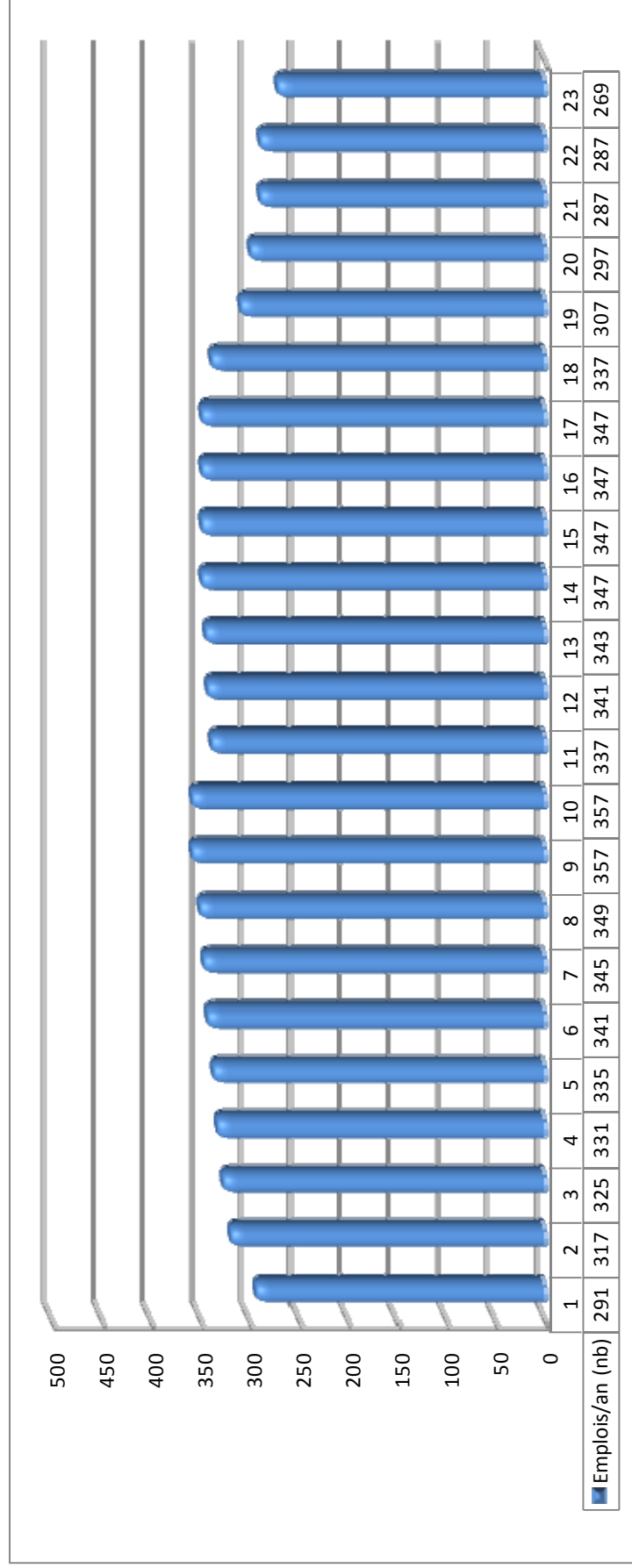


Figure 2 Evolution of the number of employees required during the operation phase

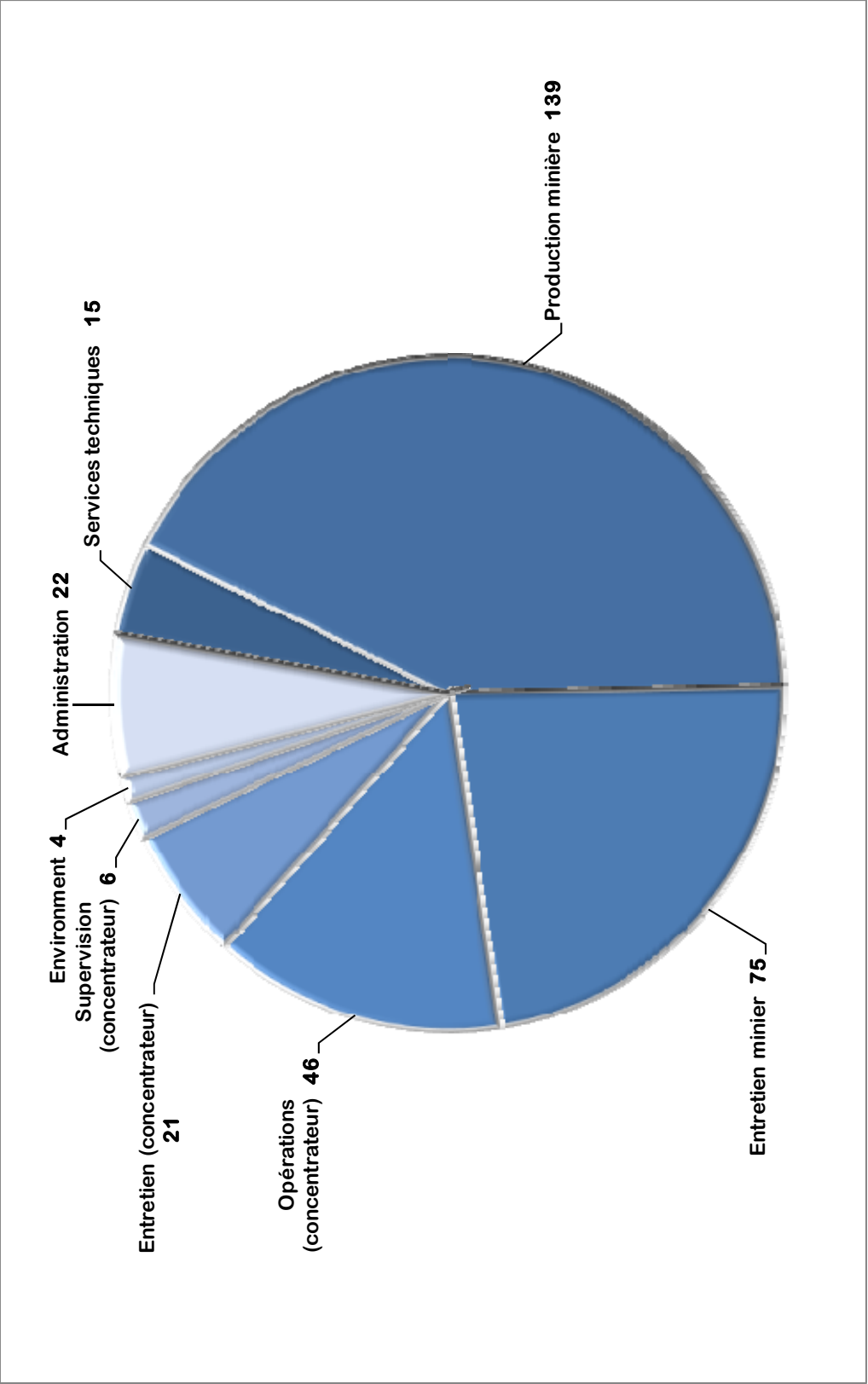


Figure 3 Distribution of employment by service (annual average - 23 years)

These investment costs include materials, transport and labor for the construction and installation. They will be spread over a period of about three and a half years, and include the commissioning of the plant. Investment costs also reflect the connection to the Hydro-Québec network and the relocation of the railway. Detailed engineering, tenders and all costs are incurred before the commencement of construction are included in indirect costs.

Operating costs will be around \$ 140 million per year, including more than \$ 30 million in wages. It will cost more than \$ 20 million per year for electricity consumption. Other significant operating costs are associated with plant operation. Operating expenses will be made from Quebec suppliers when products are available.

The total cost of the restoration of the site is estimated at \$ 25.5 million.

Arnaud mine project will create significant benefits for local communities in terms of jobs and contracts. To the extent possible, Mine Arnaud will favor the hiring of regional labor as well as the choice of companies in the region for its contracts. It will also promote local purchasing. Mine Arnaud has developed a strategy to promote the hiring of labor and the purchase of goods and services on the North Shore. In addition, Mine Arnaud will create a committee maximizing regional benefits (COMAX).

From 800 to 1000 direct jobs will be created in construction and 330 direct jobs in operation.

3.11 Preliminary reclamation plan

Section III of Chapter IV of the Québec *Loi sur les mines* specifies that the holder of a mining right is required to perform the work of rehabilitation and restoration of land where exploration and / or exploitation were made. This work must be carried out according to the reclamation plan approved by *Ressources naturelles Québec*. The preliminary reclamation plan is presented in Section 5.13 of the impact and the report on landscape analysis.

The reclamation plan is based on the following objectives and principles:

- restoration carried out, to the extent possible, in a progressive manner so as to restore as soon as possible vegetation cover and biodiversity of the site;

- maximizing the recovery of the original uses of the site;
- consultation and participatory approach with interested and affected parties;
- seeking new vocations to continue the use of the area;
- habitat restoration applying verifiable environmental criteria;
- sustainability of restoration works;
- maximizing the recovery of buildings, infrastructure and equipment;
- retrocession of lands and recovery of usage;
- recovery, to the extent possible, of surface water drainage conditions similar to those observed before the implementation of the project;
- a period of surveillance and environmental monitoring in post-closure phase.

Table 1 presents the activities of rehabilitation and restoration for each of the project components. Figure 4 shows an aerial 3D view of the mine site in progressive restoration, after 10 years of operation. Figure 5 shows the mine site shortly after its closure, on year 24.

Table 1 Rehabilitation and restoration activities for each project components

Component of the project	Rehabilitation and Restoration
Processing plant and associated buildings	Buildings and structures will be dismantled and salvageable materials will be set aside and sold on the recovery and used markets. Concrete slabs will be perforated, covered with overburden and vegetated. Slabs or parts of slabs that are stained with oil, mineral grease or chemicals must be decontaminated or removed and placed in an authorized site. Non-contaminated demolition debris will be transported in an authorized site.
Screening mound and overburden piles	The screening mound will be vegetated in the early years of operation. It will be seeded and planted with seedlings of spruce and fir to allow rapid recovery of the forest cover. Both areas will be vegetated at the end of the operation phase.
Waste rock dump	The surface of the waste rock dump will be reshaped to integrate the local landscape and recreate drainage and then will be vegetated.
Low-grade ore stockpile	At the end of mine life, the stockpile of low-grade ore will be gone since it will be sent to the plant to be processed. The area will be vegetated.
Tailings cells	Tailings cells will be gradually restored and vegetated. At closure, all cells will be reshaped to recreate the flow pattern of surface water and all surfaces will be vegetated. As the flotation tailings and magnetic tailings cells are no longer used, they will be reshaped to restore as far as possible the original drainage pattern. Then they will be covered with a mixture of overburden and topsoil mainly from the operation of the pit. The sill of the dykes' spillways will be lowered as much as possible to minimize the possibility of water accumulation in the tailings cells. A drainage ditch with geotextile and riprap will be developed to promote the flow of water and prevent soil erosion. At the end of the operational phase, the water in the accumulation basin will be pumped, treated and discharged into the Clet Creek. A breach will then be applied in the dam to allow free flow of water. The basin will then be planted.
Pit	At the end of the mine life, pumping activities to maintain the pit dry will stop so that it will gradually fill with infiltration water and precipitation to become a small waterbody. The waters from the low-grade ore stockpile and the northern portion of the pit will be directed to it to accelerate its filling. Development of the shoreline of the pit will create a littoral zone for the development of organisms, including the benthos. Ditch will be built in the area of the lowest point of the edge of the pit to direct excess meltwater to a small stream located to the east of the pit and flowing to the <i>Baie des Sept îles</i> . An earth mound barrier preceded by a moat will be built around the pit to prevent access.

Table 1 Activities of rehabilitation and restoration for each project components (continued)

Component of the project	Rehabilitation and Restoration
Drinking water and black water facilities	Facilities for drinking water and for the treatment of black wastewater will be transferred to an administrative authority, or they will be dismantled.
Treatment facilities of industrial wastewater	Treatment facilities of industrial wastewater will be dismantled.
Access road and mining roads	The access road to the site will be left intact and reverted to the town of Sept-Îles or zec Matimek. Mining roads on the site will be scarified and vegetated. Wherever possible, the drainage will be restored to conditions similar to those before the implementation of the project.
Electrical installations	Electrical installations will be dismantled.
Equipment and heavy machinery	To the extent possible, all facilities will be reused or sold as used equipment. The rest will be sold for scrap or disposed at an authorized site.
Storage of explosives	The explosives will be exhausted at the end of operations or returned to the supplier. Explosives management facilities will be dismantled and the area will be vegetated.
Port facilities	Port facilities will be transferred to an administrative authority or dismantled. To the extent possible, all facilities will be reused or sold as used equipment. A soil characterization will be performed in all relevant areas.
Petroleum products, chemicals, solid waste and hazardous waste and contaminated soil	Petroleum products and chemicals will be exhausted at the end of operations or sold. All surface and underground tanks and piping of petroleum products will be dismantled and disposed of in accordance with applicable regulations. Adjacent soils will be characterized to verify the presence of contamination and, if necessary, adopt appropriate rehabilitation measures. Solid waste generated by mining activities and during the closure of the site will be placed in appropriate containers and disposed at an authorized site.
	Pursuant to section 31.51 of the <i>Loi sur la qualité de l'environnement</i> , within six months following the final activity, a characterization study will be carried out in the industrial areas likely to have been contaminated by mining activities, excluding accumulation areas. If necessary, a remediation plan will be submitted for approval to MDDEFP.

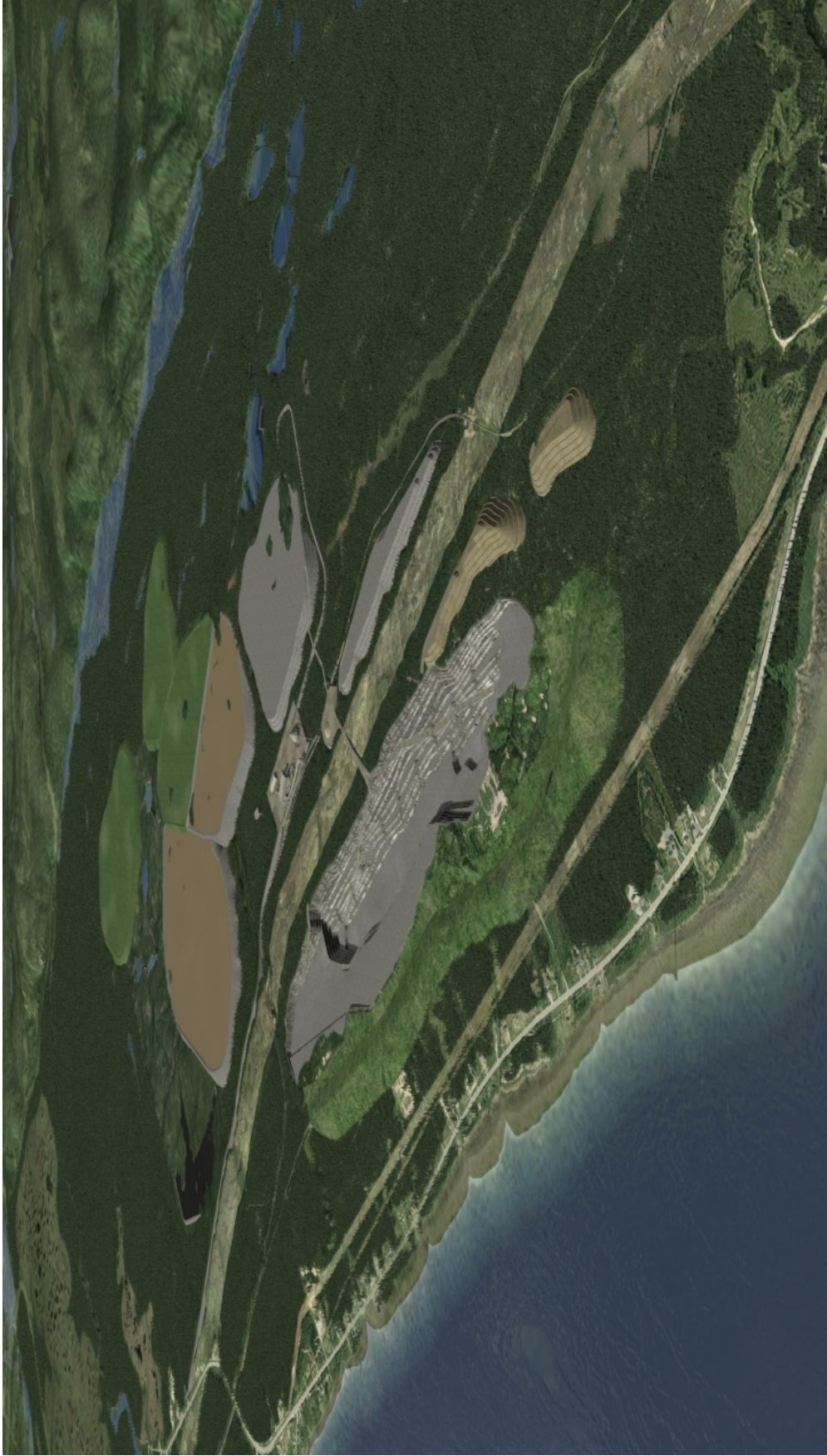


Figure 4 Progressive rehabilitation, year 10



Figure 5 Final rehabilitation, year 25

4. PUBLIC PARTICIPATION

In an interactive approach to promote the social integration of the project, Mine Arnaud has put forward a process of discussion and consultation with various stakeholders.

These outreach and consultation were held from 2010 to today, in the context of the feasibility study and preparation of the EIS. They will continue in 2013, including the establishment of an advisory and monitoring committee by Mine Arnaud and through the consultations that will be conducted as part of the environmental assessment process, including public hearings of the BAPE.

4.1 Preliminary information and consultation activities

The preliminary information and consultation activities had as objectives to establish a climate of exchange, to explain the project and to understand community's concerns and take them into account in the EIS filed in March 2012. As part of these activities, information and consultation which took place between the fall of 2010 and February 2012, around 40 meetings were held in which more than 100 people attended.

4.1.1 Target public

Exchanges were made through individual or group meetings, but also through emails, letters and documents.

The following groups were met:

- residents and owners of Canton-Arnaud;
- leaseholders directly affected and other located in periphery;
- the holders of trapline;
- the representatives of snowmobile and quad clubs;
- managers of the zec Matimek;
- the representatives (elected, civil servants) of the towns of Sept-Îles and Port-Cartier;
- the representatives of the Innu community of Uashat mak Mani-Utenam;
- the *municipalité régionale de comté (MRC) de Sept-Rivières*;

- representatives of provincial ministries (MNR, MDDEFP);
- the representatives of federal ministries;
- local environmental groups;
- several other stakeholders (deputation, local businesses, etc.).

4.1.2 Communication tools

Several communication tools were used in the preliminary activities of the consultation:

- PowerPoint presentations;
- toll-free telephone service;
- newsletter;
- website, including frequently asked questions and documents presented to stakeholders;
- information brochure focusing on the presentation of the project, Mine Arnaud and its commitments;
- hiring a local resource as director of community relations and communication;
- opening a place of business in Sept-Îles acting as Community Liaison Office.

At any time from Monday to Friday between 8 am and 5 pm, it is possible to report to the office of Community Liaison at 690 Laure Boulevard, suite 121, in order to obtain information on the project. Any person may also write to: info@minearnaud.com or call this number: 418 960-0060.

4.1.3 Results

4.1.3.1 Concerns

Based on the reports from the preliminary information and consultation activities, a first comprehensive review of concerns was conducted. They are presented in Table 2.

Table 2 Key issues and questions raised in the preliminary activities of information and consultation

Themes	Key issues and questions
Nuisance	<ul style="list-style-type: none"> • Noise • Vibration • Blasting • Traffic • Dust • Landscape
Environmental Protection	<ul style="list-style-type: none"> • Effluent discharge • Water quality • Air quality • Watercourses • Wildlife • Aquatic life • Tailings site
Operations	<ul style="list-style-type: none"> • Closure and rehabilitation plan • Ore production • Site development • Water supply • Material to be extracted • Operation techniques • Project schedule
Property acquisition and compensation measures	<ul style="list-style-type: none"> • Terms purchases and compensation • Terms of relocation • Effects on property value
Land use	<ul style="list-style-type: none"> • Loss of property use • Hunting • Tracks and trails • Access to territory
Information and stakeholder participation	<ul style="list-style-type: none"> • Information presented and communication • Transparency • Stakeholders consulted • Terms of participation of the native community
Social	<ul style="list-style-type: none"> • Psychosocial impacts • Social acceptability • Shortage of housing • Safety • Attachment to the property and to the region
Exploration	<ul style="list-style-type: none"> • Specifications of drilling
Siting	<ul style="list-style-type: none"> • Pit • Access to the mine
Mining regime	<ul style="list-style-type: none"> • Respect of standards, laws and regulations

4.1.3.2 Mine Arnaud Responses and commitments

These outreach and preliminary consultation conducted by Mine Arnaud with the parties involved in the project have led to improve the design of the project and to integrate these changes to the EIS. These changes come in the form of improvements or changes to the technical concept of the project, the location of infrastructure and facilities and commitments from Mine Arnaud to consider and take action on the issues raised.

Among the commitments and responses, some stand out especially traditional commitments, and they underline the good will of Mine Arnaud, including:

- implement a system of water recirculation and treatment to avoid water withdrawal from the site;
- gradually rehabilitate the tailings cells to reduce their footprint;
- pay an initial guarantee covering 100% of the costs of mine reclamation;
- maximize economic benefits by creating a COMAX;
- set up an advisory and monitoring committee;
- analyze a second alternative for the access road and consult the community to determine the alternative to be retained;
- separate as much as feasible the project infrastructures from homes and resort to the most efficient equipment in terms of minimization of noise;
- consider the possibility to review the construction sequence of one of the tailings cells to reduce impact on moose;
- convey the ore to the port by railway instead of by truck;
- reforest the land used for exploration, if the project does not go forward;
- construct a screening mound south of the pit to reduce the visibility of mining facilities and mitigate noise from mining activities at each phase of the project.

4.1.3.3 Uashat mak Mani-Utenam Community

Mine Arnaud's project takes place on a territory claimed by the Innu community of Uashat mak Mani-Utenam. The community wishes to take part in a variety of ways to economic development projects in the region. Mine Arnaud intends to consolidate its relationship of trust and partnership with the community and has already initiated steps in this direction.

The inclusive approach to information and consultation Mine Arnaud deployed aims to integrate the Innu community of Uashat mak Mani-utenam through several commitments according to the expectations expressed by the community:

- protect the environment and maintain the traditional Innu activities;
- create employment and business opportunities for the Innu community;
- ensure the profitability of the project;
- provide training to members of the Innu community;
- support operations management with specific rules and equal opportunity for all employees;
- create a specific position within the company as Innu Coordinator to help integrate the work of members of the Innu community.

Mine Arnaud intends to propose and define, together with the Innu community of Uashat mak Mani-utenam, an information and consultation program which will allow defining an Impacts and Benefits Agreement (IBA) in an atmosphere of trust and mutual respect.

The approach aims to develop a project in line with the expectations of the community, including a share of the economic benefits to the community, and secondly to integrate its definition, implementation and monitoring.

4.2 Pre-consultation

The approach called pre-consultation was implemented voluntarily by Mine Arnaud upstream of the information and consultation mandate of the BAPE. On the one hand, this process took place between May and November 2012 and allowed individuals and groups to be apprised of the EIS. On the other hand, it gave them the opportunity to participate actively in the environmental assessment of the project by expressing their views, before the end of the environmental assessment process.

The pre-consultation model was defined based on the results of interviews conducted in the field by the firm Transfert Environnement, during the month of February 2012, with a sample of stakeholders representative of the community and its interests. At the beginning of the process, a public announcement was made through the media to inform the public of the mechanism of the pre-consultation and to invite them to learn about the project and to express themselves on Mine Arnaud website and at the Community liaison office.

4.2.1 Phases of pre-consultation process

Pre-consultation was modulated in three phases.

- Phase 1: sector meetings with representatives of the community (municipal, environment, business, community groups, public health, residents, unions, schools, recreation and tourism, and the Innu community) to provide them with first-hand information, address their concerns and consult different groups according to their expectations. They were held from May 7 to July 12, 2012.
- Phase 2: Thematic workshops and public information activities on the major themes of the EIS: project and landscape, vibration and noise, water quality and water management on the site; air quality; socio-economic impacts and benefits, including housing and employment. They were held from October 25 to 27, 2012.
- Phase 3: A meeting for presentation and validation of the results of the pre-consultation, including consultation on the ways in which participants would be informed and participate in the development of the project. Mine Arnaud also presented the actions taken since the pre-consultation meetings to address the concerns and suggestions of the participants. This meeting was held on 29 November 2012.

4.2.2 Pre-consultation results

The detailed results of the pre-consultation are presented in Annex 1 of Volume 2 of the Supplement n^o 4 to the EIS. The following sections describe the main elements of the pre-consultation.

4.2.2.1 Public Participation

Phase 1 of the pre-consultation activities allowed meeting with nearly 155 people of the 330 people invited through roundtable discussions and plenary sessions. Phase 1 also included a meeting on the agreement and acquisition framework held June 20, 2012 with the residents of Canton-Arnaud. More than 220 people were invited, 60 people were interviewed as part of roundtable discussions and plenary sessions.

Phase 2 was aimed at the population of Sept-Îles. Of 330 people directly invited, 171 participated in the workshops, not counting those who visited to the kiosks.

Phase 3 was aimed at the entire population of Sept-Îles. Of the 330 people directly invited, 167 were interviewed.

4.2.2.2 Results of the three phases of the pre-consultation

Analysis of the discussions held during the pre-consultation allows us to draw the overall number of interventions, concerns and action items and commitments:

Phase 1

- 643 interventions of participants;
- 222 different concerns were expressed, of which 21 were mentioned frequently;
- 231 action items and commitments identified.

Phase 2

- 241 interventions of participants;
- 94 different concerns were expressed, of which 13 were mentioned frequently;
- 46 action items and commitments identified.

To facilitate the processing and analysis of the interventions made during the pre-consultation meetings, they were classified according to the component of the project to which they related. A total of 12 components were identified:

- infrastructure and activities;
- access roads;
- landscape;
- socioeconomic impacts and benefits;
- water quality;
- quality of life;
- air quality;
- information and participation;
- agreements and acquisitions;
- corporate;
- vegetation and wildlife;
- others.

When analyzing reports of meetings, five components stood out by the number of times they have aroused. They are presented in Table 3.

Table 3 Main themes for which comments or concerns were identified during phases 1 and 2 of the pre-consultation

Theme	Interventions (Number)	Interventions (%)	Interventions phase 1 (%)	Interventions phase 2 (%)	Number of separate concerns
Infrastructure and activities	196	22	22	22	64
Socioeconomic benefits and impacts	156	18	20	11	37
Air quality	119	14	10	22	22
Water quality	117	13	12	15	26
Quality of life	96	11	11	9	14
Total	684	78	75	79	163

Some concerns regarding health and cumulative effects have also been discussed often throughout the pre-consultation activities. Justification of the project has also raised concerns, including the presence of titaniferous magnetite in the deposit and the project location, close to the city.

Several community representatives also mentioned their special attachment to the landscape and the *Baie des Sept Îles*.

During Phase 1, Mine Arnaud submitted to a special consultation two aspects of the project: the choice of the access road to the site and point of views to define the photo-simulations.

In the case of the specific consultation on the access road, surveys have shown that the access road to the site on the east side was preferred. Indeed, 63 % of respondents favored the east, 8 % west and 29 % both alternatives. The east alternative was favored with a view to decrease traffic from Sept-Îles on Highway 138 (in the Canton-Arnaud) and a revitalization of the industrial park. Following the consultation, further studies have shown an additional cost of the east access, especially because of the construction of a bridge. Considering these new data, Mine Arnaud has opted for the west alternative. In response to concerns expressed in relation to the access road, Mine Arnaud is committed to have work shifts different than other companies' shifts and to implement a program of sustainable mobility.

The second specific consultation was to survey participants on the points of view from which they wished to have photo-simulation of Mine Arnaud's project. These views were sent to experts who have integrated them in their studies. In addition, the most requested photo-simulations were presented during the three-day thematic kiosks at the Place de Ville mall. Mine Arnaud has paid particular attention to harmoniously integrate the project into the landscape, among other things, a new conception of the screening mound.

Annex 1 of Volume 2 of the Supplement N° 4 to the impact on the environment presents in more detail the main commitments made by Mine Arnaud in response to concerns of the participants.

Phase 3

On November 29, 2012, a presentation of the summary results of the consultation was made publicly by Mine Arnaud. In total, 167 people attended this presentation after which they were asked to complete a survey to collect their assessment on the following aspects:

- Assessment of the informative component of the process: 93 % of those who produced a questionnaire answered this question. Respondents were mostly consistent or agreed to some degree with the statement that the activities of the pre-consultation helped them learn more about the project.
- Assessment of the consultation component of the process: 91 % of those who produced a questionnaire answered this question. Respondents who participated in the pre-consultation agreed or mostly agreed with the statement that the pre-consultation activities allowed them to express their views on the project.
- Assessment of strengths and areas for improvement: 66 % of those who produced a questionnaire answered this question. Respondents who had participated in the activities of the pre-consultation expressed the following major strengths: the project information (quantity, quality, accessibility) demonstration of listening, interest and availability to answer questions and concerns of participants. Respondents who had participated in the pre-consultation activities mentioned among the main areas for improvement: lack of answers or responses by Mine Arnaud deemed insufficient; charm campaign and project marketing, lack of transparency.
- Evaluation of the pre-consultation summary report: 83 % of those who produced a questionnaire answered this question. Respondents were mostly consistent or somewhat agreed with the statement that the pre-consultation summary report presented in the evening reflected the concerns expressed during the activities.
- Evaluation of Mine Arnaud follow-ups and commitments: 82 % of those who produced a questionnaire answered this question. Respondents were mostly consistent or somewhat agreed with the statement that Mine Arnaud's follow-ups and commitments had responded to the major concerns expressed during activities.

Note that the pre-consultation held as part of the completion of the EIS does not replace the possible holding of an examination of the project by the BAPE, once the impact has been deemed admissible by the MDDEFP. The BAPE public hearings, in which Mine Arnaud will participate with transparency, will be the last step of the Quebec procedure of evaluation and review of the impacts of the project on the environment. Public consultations will also be held by the Canadian Environmental Assessment Agency.

4.3 Tools for communication and exchange

Despite the various activities held as part of the pre-consultation process and results, there remain concerns regarding Mine Arnaud and its project. Dialogue with interested individuals and groups will continue with the aim of strengthening the bond of trust and walk with the community through the issues related to the project.

The current or forthcoming means and tools of communication and exchange mainly aims to enrich the trust established between Mine Arnaud and affected or interested stakeholders, to validate the integration of expectations and concerns and develop privileged exchange channels to address the issues raised in depth in order to promote the social acceptability of the project. These methods and tools are presented in Table 4.

Mine Arnaud is also committed to implement several programs, plans and workgroups presented in detail in Annex 1 of Volume 2 of the Supplement N° 4 to the EIS on the environment.

Table 4 Means and tools of communication and exchange with the community

Resources and tools	Description
Community Liaison Officer	A community liaison officer, also director of communications and media relations, is available to maintain the link with the community. She transmits the questions and concerns of citizens to representatives of Mine Arnaud.
Community Liaison Office	A place of business was opened in Sept-Îles and serves as Community Liaison Office.
Press and radio	Radio messages, information documents in the regional weekly newspapers, press releases, press briefings and interviews
Telephone line	A resource answers to questions and record the comments of citizens for Mine Arnaud. In the two weeks before the pre-consultation activities, a resource answered questions.
Interactive website	Updated frequently, the website contains all the information about the project. Citizens can send their comments, and find a list of frequently asked questions, along with Mine Arnaud's answers. Mine Arnaud regularly publish on its website and in the local press, information capsules presenting, by topic, the information presented in the information document to promote public broadcasting.
Mail	Newsletters about the project and the approach Letters of invitation to activities Send meetings summaries to invitees
Advisory and Monitoring Committee	The Advisory and Monitoring Committee, representative of the community, would aim to offer residents, citizens and concerned organizations, concrete ways to inform and to be consulted on the project's progress.
Municipality-Enterprise Table	The Table would aim to give representatives of municipal affairs concrete ways to inform and to be consulted on the project's progress and treat specific issues that affect them.
Special meetings	To address specific issues, Mine Arnaud will be asked to hold meetings with specific groups in the community.
Access to experts	Thematic workshops Holding of thematic kiosks

5. CURRENT CONDITIONS AND MAIN IMPACTS ON THE ENVIRONMENT

The project environmental review was conducted from documentary sources as well as surveys and inventories conducted in 2010, 2011 and 2012. The description of the physical, biological and human environment, including the landscape, and the project's effects on these components are presented in Chapters 7, 8 and 9 of the EIS as well as in documents responding to questions from government agencies.

The project has been optimized to minimize, to the extent possible, potential impacts on the environment. It will, nonetheless, result in negative impacts that will require special attention, including environmental monitoring and specific management. Table 6, at the end of this chapter, summarizes the residual impacts of the project that may persist after the application of mitigation measures.

The *Canadian Environmental Assessment Act* (section 16 (2) d)) also requires that a comprehensive study of a project examines the capacity of renewable resources that could be significantly affected by the project to meet current and future needs. Chapters 7, 8 and 9 include a review of the effects that the project might have on the following renewable resources: drinking water, forest, fish and fisheries, and wildlife and its use (hunting and trapping). These sections show that, with the proposed mitigation and compensation measures, the project will not have significant effects on the use of these renewable resources. Chapter 10 of the EIS discusses the compensation program for the loss of fish habitat. Chapter 11 discusses the cumulative effects of the project (Chapter 8 of this summary), while Chapter 12 summarizes the project effects and the proposed mitigation measures.

Lastly, Mine Arnaud intends to participate in the environmental program *Alliance Verte*, a certification proposed to companies operating within the Port of Sept-Îles.

This chapter briefly presents the current conditions for the environment components for which project effects are anticipated. It also describes the impacts on those components for the construction, operation and closure phases.

5.1 Physical Environment

5.1.1 Air Quality

Current Conditions

No ambient air quality stations, for which data are public, are currently in operation in Sept-Îles. Due to the lack of air quality data in Sept-Îles, a citizens committee, as well as the authorities from the town of Sept-Îles made representations to the MDDEFP for measuring stations to be located in the city. In response to this request, two measuring stations have been installed in June 2012. However, the data from these stations are not yet available.

To assess the current air quality in the project area, Mine Arnaud has conducted air quality monitoring over a period of five months, from June to November 2012. These stations were installed according to the prescriptions of the national network of atmospheric pollution monitoring. Fine particulates as well as total particulate matters and metals were measured. The results show that current air quality in the project area is good, being well below the applicable air quality standards for these parameters. In fact, the maximum concentration of total particulate matters measured is $24 \mu\text{g}/\text{m}^3$, while the standard is $120 \mu\text{g}/\text{m}^3$. The maximum concentration of fine particulate matters is $11 \mu\text{g}/\text{m}^3$, while the standard is $30 \mu\text{g}/\text{m}^3$. It is important to note that the initial concentrations measured were adjusted due to the limited duration of the sampling period which is less than a full year. A safety factor, defined by the MDDEFP was applied to the initial concentrations measured daily. The values used for modeling are therefore $38 \mu\text{g}/\text{m}^3$ for total particulate matters and $15 \mu\text{g}/\text{m}^3$ for fine particulate matters.

Analysis of impacts

It should be noted that Mine Arnaud has designed its project to minimize dust. The measures that are part of the project include:

- regular watering of roads to the pit, the tailings, and stockpiles;
- controlling the speed of trucks;
- accumulating the ore, once crushed, under a closed dome;
- transporting crushed ore in closed conveyors;
- installing scrubbers on all equipment (crusher, transfer tower, loading silos and conveyors);
- using hydroelectric energy source to power the plant, thus avoiding atmospheric emissions;
- ore processing in wet conditions, thereby reducing dust emissions;
- keeping the tailings in wet conditions to minimize wind erosion;
- progressive reclamation of the tailings cells;
- storing apatite concentrate in closed silos;
- transporting the concentrate to the port of Sept-Îles in closed cars.

The modeling of atmospheric dispersion was conducted as part of the environmental review to assess the potential effects of the project on ambient air quality. The modeling was revised in the fall of 2012. Two scenarios, the year 6 and year 10 of mine operation, were selected for this new modeling, mainly because of high tonnage to be extracted, the location and depth of drilling, as well as the location of the different stockpiles.

The modeling approach used was based on the methodology proposed in the *Guide de modélisation de la dispersion atmosphérique* from MDDEFP. Baseline data specific to the mining project have been used, namely local weather data (5 years) for Sept-Îles and Pointe-Noire and specifications associated with the activities, equipment and mining infrastructure provided by Mine Arnaud. Emission rates were derived from the latest technical data available to describe the normal operation of the mine facilities. Atmospheric dispersion was modeled with the CALPUFF software, recommended by the MDDEFP.

Anticipated impacts on ambient air quality from mining activities were evaluated in a conservative manner (using worst case scenarios). Contaminants selected for modeling include particulate matters (total and fine), metals, nitrogen dioxide (NO₂) and sulfur dioxide (SO₂). These contaminants are link to mining activities, including blasting (drilling and blasting), the operation of mining equipment (loading / unloading equipment, exhaust), routing and different stockpiles (waste rock, ore, tailings, and overburden).

In compliance *with the Règlement sur l'assainissement de l'atmosphère (RAA)*, the maximum concentrations obtained by modeling five years of weather data were added to current levels representative of the study area (baseline concentrations without the influence of the project). Subsequently, the overall results were compared to air quality standards for each contaminant to assess the environmental effect.

In year 6, the modeling results indicate that air quality standards are met at all time for fine particulates, metals, nitrogen dioxide and sulfur dioxide. In the case of total particulates, a slight exceedance per year was observed at the south of the site, near a residence in an area adjacent to the mining property boundary. This exceedance occurs in conditions of calm winds from the north. However, since the modeling did not take into account the days of rain, the deposition of particulate matters, or the new obstacle created by the screening mound, it is unlikely that this exceedance will actually occur.

For the year 10, the modeling results indicate that air quality standards are met at all times in populated areas for total particulates, fine particulates, metals, nitrogen dioxide and sulfur dioxide.

Localized exceedances of total particulates, fine particulates, chromium, arsenic and nitrogen dioxide (over 1 h) could be encountered in an uninhabited area located near the pit. These exceedances occur in conditions of calm winds from the northeast and are caused by dust emissions linked to routing (road going down into the pit).

However, according to a conservative scenario, pit activities (routing, drilling and blasting) were all placed in the west portion of the pit, near residences. However, according to information provided by Mine Arnaud, activities in the pit will most likely be taking place in two or three zones concurrently, including one in the eastern portion of the pit. The amount of material extracted in the west of the pit should be smaller, resulting in a reduction of dust emissions anticipated in this area.

The results for the year 6 and 10 of operation also indicate that the mining activities would have a negligible effect at the drinking water intake located at Lac des Rapides, at the campground located at Lac Hall, and in the Parc Ferland neighborhood, located at more than 5 km of the site.

It is important to note that the modeling did not take into account precipitation, particulate matters deposition, or the obstacle created by the screening mound. These parameters may decrease the concentration of particulates in ambient air, especially for total particulate deposition.

Given the results of the two scenarios modeled, Mine Arnaud committed to install air quality monitoring stations near homes in order to ensure compliance with the air quality standards in areas where sensitive receptors are located. Thus, mitigation measures put in place to control dust during operation will be assessed on a continuous basis and may be adjusted as needed.

Mine Arnaud will rigorously apply all proposed mitigation measures to reduce the effect on air quality, including regular watering of its entire road network (water and dust control).

5.1.2 Noise level

Current Conditions

To assess the current sound levels, Mine Arnaud measured sound level continuously from 6 pm on July 19, 2011 to 6 pm on July 20, 2011, and from 22 pm on October 25, 2012 to 7 pm on October 27, 2012, at four locations, close to the mine site:

- Point P1: near 3685, Highway 138 (2011 - Canton-Arnaud);
- Point P2: Arnaud mine entrance, at 35 m from Highway 138 (2011-2012);
- Point P2b: Arnaud mine entrance, at 135 m from Highway 138 (2012);
- Point P3: near the roundabout at Avenue Arnaud (2011 - Sept-Îles).

The noise level at points P1 and P2 is dominated by traffic on Highway 138. It reaches 65 dBA (decibel) during the day and 54 dBA at night at P1, and 63 dBA during the day and 52 dBA at night at P2. The noise level at point P2b, corresponding to that in the backyards of residences along Highway 138, was evaluated at 49 dBA during the day and 42 dBA at night. Measures at point P3 were taken only in 2011, amounting to 56 dBA during the day and 45 dBA at night.

Based on the results of these measures and the MDDEFP Directive 019, the minimum sound level to meet during the daytime along Highway 138 will be 55 dBA during the construction phase and 49 dBA during operation. During the night, it will be 45 dBA during the construction phase and 42 dBA during operation.

Noise level have not been measured at the cottages located northeast of the pit and at the Lac Hall campground given the large distance between these areas and the mine activities. However, according to Directive 019, the applicable noise level for these sensitive areas is 45 dBA during daytime and 40 dBA at night for the cottages, and 50 dBA during daytime and 45 dBA at night for the campground.

Analysis of Impacts

Mine Arnaud has conducted simulations of anticipated noise levels that demonstrate that the project would meet the requirements of MDDEFP from an acoustic point of view. This result considers the construction of a screening mound along the southern part of the pit which would have a maximum height of 50 to 55 m in the extremities, particularly on the east side. It also considers that no earthwork activities linked to the construction of the screening mound would take place during the night to minimize the impact of noise during that period. It also takes into account the implementation of the following additional mitigation measures:

- muffler installation on trucks;
- use of rubber beds for dump truck;
- power shovels soundproofing;
- replacement of the primary crusher hammer by a quieter hammer;
- replacement of the bulldozers used to construct the screening mound by a smaller model;
- replacement of articulated trucks designed to move the overburden to the screening mound for a less noisy model;
- installation of white noise back alarms on mobile devices.

The simulations were carried out according to a specific list of equipment determined by Mine Arnaud. Thus, under the operating conditions assessed, simulations of sound propagation for key years show that the project will result in noise levels compliant with Directive 019 and the Instruction note 98-01 from MDDEFP.

5.1.3 Vibration

Current Conditions

The proximity of houses at the south of the pit and Hydro-Québec lines on the north side of the pit will require special precautions to avoid that blasting cause damage to the houses closest to the mine and to the power transmission lines. Before work begins, Mine Arnaud will implement a program to inspect foundations of houses located near the mine site.

Analysis of impacts

The project requires one daily blasting, at the end of the day, conducted according to specific parameters. Vibration modeling demonstrated compliance with the requirements of MDDEFP. In fact, the results indicate that the vibrations would vary between 0 mm/s and 5 mm/s at the nearest residences. The current provincial standard to comply with for vibration, according to Directive 019, is 40 mm/s at the residences. Mine Arnaud has set a much more stringent standard for the project, of 12.7 mm/sec for the residences and 25.0 mm/sec near the Hydro-Quebec corridor.

5.1.4 Soils and surface deposits

Current Conditions

In the study area, surface deposits are from glacial, marine, coastal and fluvial origin. The first two types of deposits are dominant on the project site.

The soils in the project area are not conducive to agricultural activities. Clays of Sept-Iles form a small band of a few hundred meters along the bay in the northeast area near the project site. These consist of a rather coarse granite sand associated with many rocky outcrops. They have a cemented horizon deemed waterproof, often called ferruginous hardpan, 60 to 90 cm thick, formed on the surface deposits of fluvio-deltaic sand. These soils are considered virtually infertile.

Analysis of impacts

The main effects on soils and surface deposits are loss of land uses of the site after mining infrastructure development, compaction and soil erosion during construction and operation, and the potential change in soil quality during construction, operation and closure in the event of a spill. Reuse of overburden for site rehabilitation will help to mitigate this impact.

5.1.5 Quality and use of groundwater

Current Conditions

The project area includes two main hydrogeological systems. The first type, confined to semi-confined, is located deep into the rock formations. The second is met closer to the surface of the soil and would be of a semi-confined water table type. It is located in the most permeable horizons of the surface geological repositories.

At the end of the summer 2012, an additional hydrogeological study was conducted to complement the one done during the environmental review. GENIVAR has collected numerous hydrologic and hydraulic data during the summer of 2012 in the rivers of the study area. A total of four hydrostratigraphic units were identified on the site, from the surface: 1) a sandy littoral horizon present only in the area of the pit, 2) a clayey silt of variable thickness, occasionally containing larger proportions of sand; 3) a sandy and gravelly till and 4) a rock composed mainly of metamorphic rocks.

Water levels measured in the area of the tailings site are either near the surface (between 0.07 and 2.81 m deep) or above the ground surface. Water levels measured in the pit area varied between 0.20 and 4.61 m from the ground surface.

The flow would occur towards the *baie des Sept Îles*, in accordance with the local topography. The average hydraulic gradient in this area is 1.9 %. The results of permeability tests were used to assess the average hydraulic conductivity of 1.07×10^{-7} m/s for the clayey silt horizon, 2.65×10^{-5} m/s for till, and 9.81×10^{-8} m/s for the rock. Hydraulic conductivities measured for the rock being low, the water will tend to run off the surface and infiltration will take place in areas that are more fractured. Few fractures were identified during drilling.

Monitoring of the groundwater quality indicates that the water in the project area is carbonated/sodic and calcic. Surface water samples collected had lower average concentrations for all parameters. The highest concentrations are noted in the groundwater samples collected from the rock unit in the pit area. Exceedances of criteria are noted for the following metals: aluminum, barium, boron, copper, iron (pit area) and manganese. The results for all other metals are below the criteria *Résurgence dans les eaux de surface et infiltration dans les égouts (RESIE)*.

Some water samples in the pit area have a relatively high chloride concentration. Although the origin of brackish water is unknown, the hypothesis proposed here is that it would come from ancient marine waters. Given the anticipated presence of thick clay deposits in the bottom of the baie des Sept Îles (over 15 m), it is unlikely that the brackish water identified in some wells come from an interaction with the saline waters of the bay. Brackish water volumes would thus be confined in an area between the southern boundary of the pit and the bay.

Analysis of impacts

With the information available, there is no evidence suggesting that interactions are present between groundwater and surface water. However, additional characterization will confirm this with more certainty.

According to the available information and the assumption that the brackish water in the groundwater samples come from ancient marine waters, there would be no hydraulic connection between the bedrock aquifer and the baie des Sept Îles, clay deposits acting as a hydraulic barrier.

The ongoing numerical modeling will help to clarify the potential hydraulic link and to evaluate the volumes of water from the southern sector of the pit. Thus, it will be possible to estimate the proportions of brackish water that could potentially seep in during mining operation.

5.1.6 Hydrology

Current Conditions

The majority of the project site drains into the baie des Sept Îles through a series of streams more or less parallel to each other. The western portion of the mine site drains into Clet Creek which empties into the baie des Sept Îles. The northern part of the site (including the waste rock dump and part of the industrial site) is located in the watershed of an unnamed creek that flows into the rivière des Rapides, about 1 km upstream from the baie des Sept Îles. The rivière des Rapides is the outlet of lac des Rapides. The drinking water intake of the town of Sept-Îles is located in this lake. This water intake is therefore located upstream of the confluence of the unnamed creek and of the rivière des Rapides. Just 1 km to the north of the project, a small portion of the study area drains to lac Hall.

Streams located in the study area generally drain areas less than 1 km². Four streams drain areas somewhat larger; Clet Creek, R10, R11 and Gamache Creek.

Lakes within the study area are of small size and drain small watersheds (less than 1 km²), with the exception of Petit lac du Portage which drains a basin of 2.2 km².

Analysis of impacts

Mining infrastructure will affect the hydrology of rivers by altering watersheds and drainage patterns. Runoff from the tailings cells (flotation and magnetic), the waste rock piles, the low-grade ore stockpile, the pit, and the plant site (concentrator, water treatment plant) will be intercepted and routed to the water accumulation basin to be recycled to the concentrator or processed in the water treatment plant. Thus, the area occupied by these components will not contribute anymore to the natural runoff of some watercourses.

A dam will be built across Clet Creek, just north of Hydro-Québec's power lines to create an accumulation basin. The flow upstream of the dam will be intercepted. Thus, only the portion of the watershed located downstream of the dam will contribute to the flow in Clet Creek. The mine site will have only one effluent which will be routed into Clet Creek downstream of the dam.

Runoff from the overburden accumulation areas will be captured by drainage ditches and accumulated in sediment basins to ensure quality control before being discharged to the environment. The overburden accumulation areas will alter the watershed boundary of some watercourses.

The mining project will have impacts on the hydrology of some watercourses and lakes by reducing the size of their watershed. In the case of Clet Creek, R10, R11 and Gamache Creek, the reduction of the size of their catchment area, at the maximum expansion of the mining project, will be respectively 64 %, 46 %, 68 % and 27 %. This will result in changing the watershed concentration time, volumes of water runoff, and flow rates. These effects will be more important for precipitation events greater than 5 mm of rainfall. For rainfall of less than 5 mm, no significant runoff is produced. Flows in watercourses will be modified in the same proportion to changes in the watershed area.

In the case of lakes, these impacts will be limited to a few days. Indeed, the collected data show that after precipitation, lakes revert back to their level and initial outflow within 4 to 7 days after the onset of precipitation.

According to the information gathered as part of the hydrogeological study conducted in 2012, it is unlikely that the level of watercourses and lakes surface area will be affected by dewatering of the pit. This hypothesis will be confirmed by the numerical modeling currently underway.

5.1.7 Quality of surface water and sediment

Current Conditions

Samples of surface water and sediment were collected in 2011 and 2012, at several stations located throughout the study area. Surface waters are generally acidic and low in suspended solids. They are well oxygenated. These waters are also very poor in nutrients, especially nitrogen and phosphorus. In general, surface waters contain low concentrations of metals and metalloids. However, they are characterized by high concentrations of aluminum and iron, in excess of the criteria for the protection of aquatic life (acute or chronic). Such exceedances are common in natural environments on the North Shore.

In sediment, metal concentrations are frequently below the detection limits of the analytical methods used. Some metals such as copper, chromium, zinc, iron and calcium may be present in higher concentrations. Regarding sediment grain size, there is a strong preponderance of sand at most stations.

Analysis of impacts

Mine Arnaud chose to construct a water treatment plant that will allow for water recirculation on the site and in the ore processing plant. In doing so, Mine Arnaud will avoid pumping water from the surrounding environment and the use of potable water in the process. Once treated, the excess water will be returned to Clet Creek and comply with all applicable environmental standards.

The Arnaud mining project will not cause any impact on the city of Sept-Îles drinking water intake located in lac des Rapides, since the project is located downstream of the water intake. In addition, the project is not located in the same watershed than the one which feeds the drinking water source. The center of the pit will be approximately 6 km from lac des Rapides. Modeling of atmospheric dispersion of dust conducted as part of the environmental impact assessment shows that the dust generated by the project could reach the lac des Rapides under certain conditions, but that dust concentration would be negligible and would not affect the water quality of the lake, and the drinking water source.

With respect to uranium in water, leaching tests performed on the ore and waste all showed uranium concentrations in leachate under the detection limit of the analytical method used (0.02 mg/l). These results are also 10 times lower than the Quebec uranium standard in drinking water (0.2 mg/l) and similar to or less than the uranium content of Vichy water. In the context of the Arnaud mine project, uranium is not an environmental or public health concern.

5.2 Biological Environment

5.2.1 Vegetation

Current Conditions

Terrestrial vegetation

Black spruce-moss is the most abundant vegetation cover in the study area, covering a little less than 35 % of the land area. Balsam fir-white birch and balsam fir feathermoss are second and third in abundance.

Wetlands

La baie des Sept Îles is recognized provincially for the presence of wetlands of ecological importance. It is part of the *Zone importante pour la conservation des oiseaux (ZICO)* of Sept-Îles, which covers an area of approximately 242 km² and includes marshes, salt meadows and a large bog, the Checkley plain. This area is a site of great interest for the conservation of wetlands. For the entire mining property, water bodies and wetlands occupy respectively 4.1 and 5.5 % of the area.

Riparian wetlands are located essentially along of the main streams, such as Clet Creek. They represent about 1 % of the land area in the biophysical region of interest and a little less than 10 % of the wetlands identified. In addition to these riparian wetlands, only bogs were identified in the study area: the forested bog and open bog (treeless). They cover about 10 % of the land area of the biophysical region of interest and represent 90 % of the wetlands identified. Forested bogs are very poor in terms of species richness. Open bogs provide greater richness. However, only three bogs of this type have been identified within the mining property. Two of them are located outside the areas covered by the project, in the southwest and northeast of the mining property.

A detailed inventory of wetlands in the study area and adjacent coastline of the baie des Sept Îles was completed in September 2012. In the interior, the following wetland types were identified: beaver pond, shallow water (aquatic grass beds), marshes, marsh-swamp, swamp, low shrub swamp, high shrub swamp, waterfront open bog, open bog pond, uniform shrub bog, woody bog, uniform shrub fen, and uniform open fen. Along the coast, wetlands identified were: shallow water (eelgrass bed, salt panne), fens, high marsh, low shrub swamp, shrub swamp and high rocky shore. With the exception of the beaver pond, all these areas were characterized using one or more samples. In total, mapped wetlands (excluding eelgrass bed) cover more than 425 ha.

Analysis of impacts

The project will result in the loss of 1,345 ha of terrestrial vegetation.

According to surveys conducted in 2012, the project in its current form, would result in the loss of 41.7 ha of wetlands, representing 9.8 % of all wetlands in the study area. These losses mainly involve complexes of marshes and swamps, the most common wetland types in the study area, and woody bogs.

Progressive revegetation of the tailings and the final restoration of the work site are the measures that will best mitigate these impacts on vegetation.

5.2.2 Wildlife

5.2.2.1 Benthos and fish

Current Conditions

The majority of water bodies in the biophysical area of interest are small (<2 ha) and relatively shallow (<3 m). These water bodies are generally composed of an organic matter and sand substrate. Because of their shallowness, aquatic vegetation colonizes the majority of their surface. The lakes are generally quite homogeneous with respect to fish habitat. The main functions identified for these lake habitats are feeding and nursery.

Inventories and studies were conducted in 2010, 2011 and 2012 to determine the species of fish present in the area affected by the project and to characterize fish habitat. In total, nine watercourses and ten lakes in or near the proposed mining facilities have been sampled using different types of gear.

A comprehensive mapping of aquatic habitats, based on photo-interpretation and field measurements (width of streams, nature of the substrate, bathymetry of lakes, aquatic plant identification, physico-chemical measurements) was performed. The total area of aquatic environments in the study area is close to 43.6 ha. Most of these areas are found in lakes, which represent 59 % of the total area. In general, watercourses in the project footprint are often permanent streams, and for most, of a width of less than 5 m. Among the ten lakes, seven small lakes occupy a surface area of 0.9 to 2.7 ha.

Two species of fish frequent the study area, the brook trout and stickleback. The brook trout is the subject of a recreational fishery, managed by the zec Matimek in some lakes outside the project footprint, including lakes Hall, de la Cache, Gamache and du Castor.

Analysis of impacts

Project facilities, mainly the pit, waste rock dump and tailings cells, will result in loss of fish habitat as lakes and watercourses will be directly affected. According to data updated in 2012 by GENIVAR, the surface area of fish habitat affected by the project is 21.1 ha.

For all lakes, streams and ponds affected by the project, yield losses of brook trout could reach up to 60 kg/year. In the event where the magnetic residues are valorized, only three lakes, rather than seven, would be affected by the project. The encroached area would be significantly smaller (8.7 ha), as well as the impact on production of brook trout (30 kg/year).

In accordance with the *Fisheries Act*, a compensation plan was developed to ensure no net loss of fish habitat. Facilities are proposed to allow fish passage at impassable sites and increase fish production. Thus, interventions were proposed for a total area of 82,250 m², including the development of 2,025 m² spawning area. The main species targeted by the compensation measures is the brook trout since it is the only species of recreational interest that colonizes watercourses and water bodies affected by the project. It is also proposed to develop Clet Creek for anadromous brook trout. This plan was developed after numerous communications with the direction of the zec Matimek and MRN representatives, as well as meetings with members of the Mamu Innu Kaikusseht Agency (AMIK) and the Uashat band council.

The proposed interventions will create higher-quality habitats (additional spawning function) compared to the existing ones, will provide a diversity of habitat within targeted streams, and will make available habitat currently unused by fish. Note that no special status fish species will be affected by the project.

5.2.2.2 Amphibians and Reptiles

Current Conditions

The project study area contains several habitats for amphibians and reptiles, including forest environments, lakes, beaver ponds, streams, ditches, swamps and bogs, in addition to temporary ponds that may be present in the spring, created by the snowmelt. These habitats are used, among other things, for breeding, larval development, feeding, migration, and hibernation. During birds and fish inventories in July 2011, garter snakes, wood frogs, and one North frog were observed in the project study area. The low representation and the low ecological value of wetlands in the project area suggest that populations of amphibians and reptiles are probably less abundant than in the rest of the baie des Sept Îles.

Among the species of amphibians and reptiles present or potentially present in the study area, only one special status species, the leatherback sea turtle, may frequent the bay.

Analysis of impacts

The project will result in the loss of habitat and will create barriers to the dispersal of amphibians and reptiles. Site restoration will partially compensate for the lost habitat. Compensation measures for fish habitat and wetlands will also create new habitat for amphibians and reptiles.

5.2.2.3 Birds

Current Conditions

The inventory of breeding birds conducted in 2011 as part of the project has confirmed the presence of 55 species of birds in the survey area, including 52 breeding species. Potential breeding habitats were identified for four species at risk: the common nighthawk, olive-sided flycatcher, Canada warbler and rusty blackbird. Two of these species, the common nighthawk and the olive-sided flycatcher, were observed during surveys of breeding birds conducted for the project.

Among waterfowl, it is estimated that three or four pairs of snipe could nest in the project footprint area, as well as five pairs of solitary sandpiper. Other waterfowl species may inhabit the project footprint, at least occasionally. The two most likely are mallard and teal. If so, their abundance would most likely not exceed more than one or two breeding pairs.

Two species of birds of prey, osprey and merlin, have been identified in the breeding birds inventory area for the project. The osprey does not nest in the project footprint area, but three nests were observed in the study area. As for the merlin, it probably nests in the southern part of the survey area, near Highway 138.

Finally, there are at least 47 species of landbirds (other than birds of prey) in the survey area. The Canada warbler and the rusty blackbird, are species of special status, that may be present in the study area given the suitable habitat for this species. Two species of birds designated as endangered, the common nighthawk and the olive-sided flycatcher, were observed in the study area. The common nighthawk was observed at three locations in the project inventory area. A single individual of olive-sided flycatcher was spotted in the inventory area, south of the railway in 2011. Inventories conducted in 2012 did not allow to locate the bird mentioned in the 2011 inventory, and no other individual was observed despite the song playback conducted at several listening stations.

The bird surveys carried out in 2012 have allowed counting breeding pairs and waterfowl broods and birds of prey. Landbirds were also surveyed using listening stations in the forest in order to complete the inventory presented in 2011. The coastal environment has been tour in order to identify the presence of species at risk. The results showed that the lakes of the study area are unfrequented by waterfowl during the nesting season. However, the baie des Sept Îles is an important place of gathering of waterfowl during migration periods. The coastal area along the study area is a zone heavily used by nesting osprey. The species feeds mainly in the baie des Sept Îles. For terrestrial species, the birds encountered are typical of habitats found at this latitude, as the observed abundances. Regarding species at risk, the common nighthawk was observed a few times and a peregrine falcon, not breeding, along the coast.

Analysis of impacts

The proposed project infrastructures are not located in areas where there is the most water bodies. Thus, few breeding pairs of waterfowl may be affected by the construction. During the operation, they are unlikely to visit the site because of the noise. The tailings cells and water accumulation basin may represent areas used by waterfowl due to the presence of water, but it is unlikely to be used for breeding because of the lack of vegetation on their periphery.

The 11 breeding pairs of birds of prey present in the study area are likely to be affected by the project, either due to loss of nesting habitat and food or nuisance caused by mine activities during the operation period (noise and dust). The project will result in the loss of an osprey nest located in the footprint of the screening mound. Other active osprey nests are located more than 2 km from the pit and should not suffer disturbance associated with noise and dust. Their feeding area is mainly concentrated in the baie des Sept Îles. For forest species such as red-tailed hawk, American kestrel, merlin and the great horned owl, the project will shift their territory since they are using the forest environment. The progressive restoration will allow these species to gradually use restored habitats.

Habitat loss will affect an estimated 1,000 breeding pairs of terrestrial birds. However, approximately 85 % of breeding pairs affected by habitat loss during construction and operation will nest again in the restored areas when these habitats will have reached full maturity.

Among the bird species at risk, only the common nighthawk will be affected by the project. It is estimated that four breeding pairs will be affected by the project. It is important to note, however, that the three pairs observed in 2011 were located in recently deforested site in the footprint of the proposed pit. An area of 130 ha of their habitat will be lost gradually during operation. This loss will be offset by the gradual

restoration of the tailings cells. During final restoration, 675 ha of open areas will be created. In the end, the conditions should be similar to the one prior to the project. In the short and medium term, the overall effect on this species will be positive since open areas used appreciated by this species will increase.

5.2.2.4 Mammals

Current Conditions

Several species of small mammals are likely to frequent the project study area, including shrews, voles, brown rats and mice. The same applies for five species of bats. About twenty terrestrial mammal species are potentially present in the project study area, the majority of which are prized for fur trapping. These species include weasel, Canadian beaver, red squirrel, wolf, river otter, marten, black bear, muskrat, red fox, and mink. Black bear and moose are among the large mammals present in the study area. Moose tracks were seen in October 2010 and in July 2011 in the study area. A female moose with two young were also observed on the railroad track. Note that the woodland caribou do not frequent the study area.

Among mammals, rock vole, the meadow-bog lemming, the red bat, hoary bat, gray wolf (the Eastern subspecies) and weasel represent special status species likely to occur in the study area.

Analysis of impacts

The preparation and development of the mine site for construction and operation, the use and maintenance of machinery, the presence of labor, supply and traffic on the site, as well as the extraction, handling, storage and treatment of the ore during operation will cause one of the following impacts:

- loss of habitat for mammals that frequent the study area;
- their disturbance due to noise and human presence;
- mortality of some individuals.

To reduce this impact, Mine Arnaud will implement, among others, mitigation measures to preserve the integrity and restore the vegetation.

5.2.2.5 Coastal habitat and marine wildlife

Current Conditions

The structure of the plant community observed in the coastal baie des Sept Îles is a succession of salt meadow, salt marshes, a mud flats without vegetation, eelgrass bed with algae, and finally a strip of algae. These coastal habitats are larval retention areas, where many species of fish achieve their stages of their life cycle. Eelgrass beds are an important habitat for aquatic fauna of the bay since several species of fish are found in this habitat. Coastal habitats found in the baie des Sept Îles are home to many species of fish. The main species of recreational and commercial interest are the Atlantic herring, mackerel, haddock, capelin, flounder, American eel, rock cod (ogac), Atlantic cod and rainbow smelt. Several tributaries of the baie des Sept Îles are home to rainbow smelt spawning area, including the rivières Hall, au Foin, and du Poste, as well as Bois-Joli Creek. The rivière des Rapides has no favorable habitats for smelt spawning.

Analysis of impacts

The main impacts that may affect coastal habitats and marine life are: modification to the quality of fish habitat at the mouth of Clet Creek; and the use of some habitat by marine wildlife at the mouth of some creeks. The various mitigation measures that will be implemented to compensate for fish habitat will also mitigate this impact.

5.2.2.6 Conservation and Protected Areas

Current Conditions

The study area includes several protected and conservation areas. The baie des Sept Îles is recognized as an important area for the conservation of birds in Quebec. Within the baie des Sept Îles, there are seven *Aires de concentration d'oiseaux aquatiques (ACOA)* along the coast. Outside the baie des Sept Îles, Corossol Island is designated as a Migratory Bird Sanctuary.

Analysis of impacts

None of the activities and project infrastructure will have direct negative impact on these protected and conservation areas. The only measurable indirect impact will be an increase in the average annual flow rate of Clet Creek whose mouth is located in one of the waterfowl concentration area in the baie des Sept Îles. All water discharged into the Clet Creek will be treated to avoid environmental contamination. At the end of the mine life, the water quality of Clet Creek will return to its original quality and its flow will be slightly reduced (in favor of R10 Creek).

5.3 Human Environment

5.3.1 Employment and Economy

Current Conditions

The project is located in the North Shore region whose economic activity is based primarily on the exploitation of natural resources. Mining, forestry, hydropower, fish and wildlife resources and the production of aluminum is the historical basis of the regional economy. However, the tourism industry has experienced a strong growth in recent years, helping to diversify this structure.

The economy of Sept-Îles, host city of the proposed project, relies mainly on the services related sectors, as elsewhere in Quebec. However, the sector's share of resource-based industries is somewhat higher in Sept-Îles, than in the province of Quebec. The number of companies linked to aluminum processing and iron mining and shipping through the deepwater port explains this situation.

Although there is no actual mine in Sept-Îles, the city is closely linked to mining activities taking place in iron deposits in Fermont, Schefferville, Labrador City and Wabush. Indeed, the Iron Ore Company of Canada (IOC), Cliffs Natural Resources (which also operates a pellet plant in Pointe-Noire) and Labrador Iron Mines carry their respective productions to Sept-Îles port terminals for shipping by boat to the global steel industry. Transshipment of iron ore is one of the most important economic activities in Sept-Îles. Other companies, such as New Millennium Capital Corp., Alderon and Adriana, said they would also use the deepwater port facilities to ship their future productions.

Unlike some other cities of the North Shore and other parts of Quebec, Sept-Îles does not experience an economic slowdown. In fact, it seems that for the first time since the early 1980s (closure of the Iron Ore), the local-regional economic activity is maintained or even expanding. This, to the point that the current situation poses many challenges which Sept-Îles and employers are striving to meet: difficulties in recruiting skilled labor, availability of housing for newcomers, pressure on municipal services and government, etc.

Analysis of impacts

Economic impacts attributable to the construction and operation of Arnaud mining project in Sept-Îles were evaluated across the province of Quebec, on the methodological basis of the intersectoral model developed by the *Institut de la statistique du Québec* (Annex 14 to document answers to questions MDDEFP). This model offers the advantage of assessing the nature of the economic impacts of a project or an activity from a detailed knowledge of the value of trade in goods and services made between the various sectors of the Québec economy in addition to identifying the value of income transfers between agents (income tax, excise taxes, etc.).

To the extent possible, Mine Arnaud will recruit labor from the local and regional communities as well as among members of the Uashat mak Mani-Utenam. During the construction phase, Mine Arnaud hopes that as in other major projects carried out over the last 20 years on the North Shore, the rate of participation of regional workers (including Innu workers) represent the least 60%. Regarding the operational phase, the objective is to maximize the number of workers from the region. It is expected that almost the entire direct impacts occur within the North Shore (since it is expected that the vast majority of mine workers will reside in Sept-Îles) and 20 % indirect benefits will occur within the North Shore.

To achieve these objectives, Mine Arnaud plans to set up a *Comité de maximisation des retombées économiques* (COMAX) specific to the project. This could consist of representatives of regional and socio-economic organisations and Innu representatives. Its mandate will be:

- include in contracts, where possible, terms regarding regional subcontracting;
- to award certain contracts to regional businesses, provided that the offers from local and regional sources are competitive;
- to establish an Impact and Benefit Agreement (IBA) with the Uashat mak Mani-Utenam band council;
- to implement procedures and develop strategies to encourage the hiring of local labor and the purchase of goods and services from the North Shore;
- to entrust the supply manager and his team the task of facilitating relations between Mine Arnaud, local businesses and, where appropriate, specialized companies from outside the region.

The mine economic impact during the construction phase was estimated on the basis of total projected capital investment of \$ 750 million for the pre-production period and \$ 300 million for support capital. The annual economic impacts were calculated on the basis of projected annual operating costs of \$ 140 million.

Direct and indirect regional economic benefits during the construction are estimated at more than \$ 160.5 million for the duration of the works. In terms of labor, the direct and indirect regional impact would amount to the creation or retention of 1,677 people engaged on a full-time basis for the period of construction (1,000 direct and 677 indirect jobs).

The direct and indirect regional economic impact of the operating phase totaled nearly \$ 77 million.

Direct and indirect annual regional economic impacts are estimated at \$ 89.7 million. In terms of labor, the direct and indirect regional impact would amount to the creation or retention of 377 people, hired on a full-time basis, yearly.

Table 5 summarizes all provincial and regional economic benefits in terms of labor and value.

Table 5 Economic benefits related to the Arnaud mine project

	Total Effects	Direct Effects	Indirect Effects	Induced Effects
<i>A. Capital Expenditures - Preproduction</i>				
Provincial Benefits				
Labor (full-time equivalents)	5,383	2,000	3,383	-
Added value (k \$)	495,869	204,333	291,537	-
Regional Benefits				
Labor (full-time equivalents)	2,012	1,000	677	335
Added value (k \$)	192,568	102,166	58,307	32,095
<i>B. Capital Expenditures - Production</i>				
Provincial Benefits				
Labor (full-time equivalents)	2,051	1,253	799	-
Added value (k \$)	190,569	129,606	60,963	-
Regional Benefits				
Labor (full-time equivalents)	943	626	160	157
Added value (k \$)	92,395	64,803	12,193	15,399
<i>C. Annual Operating Expenses</i>				
Provincial Benefits				
Labor (full-time equivalents)	563	330	233	-
Added value (k \$)	109,738	84,663	25,075	-
Regional Benefits				
Labor (full-time equivalents)	452	330	47	75
Added value (k \$)	107,614	84,663	5,015	17,936

Sources: ISQ (2009), Dion (1999) and GENIVAR.

5.3.2 Suburban and rural environment

Current Conditions

The Arnaud mine project is planned north of Canton-Arnaud, which is part of the city of Sept-Îles. Canton-Arnaud is not part of the urban perimeter, as determined by the MRC de Sept-Rivières in its development plan. It corresponds to a built-up area that extends about 8 km, approximately between the rivière Hall and rivière des Rapides. A residential development, linear in nature (low density), stretches along Highway 138 on both sides of the road, but mainly on the north side.

There are also some commercial-industrial businesses (scrap, heavy machinery, etc.). The city of Sept-Îles owns a public space, the *Chapelle du Canton Arnaud*, a multipurpose center. A vegetable producer is located east of Clet Creek on both sides of Highway 138. These lands are located on lands protected for agricultural purpose by the CPTAQ.

Analysis of impacts

The project's impact on the suburban and rural environment is linked to the encroachment on backyard lands belonging to residents on the north side of Highway 138. No home will be directly affected by the project. Mine Arnaud, however, developed an agreement and acquisition program for these owners (24 properties without houses, and 13 properties with houses) which will ensure fair and equitable treatment for all owners affected by the project. Mine Arnaud acquisition program also extends to other properties that are not directly affected by the project. Mine Arnaud will continue to have regular exchanges with the owners (e.g. information-consultation on criteria to assess property values, negotiation schedule, schedule to implement measures, information on the progress of the project, etc.). It will finally allow owners to use their land until the progress of the project does not allow it anymore.

5.3.3 Logging and mining

Current Conditions

The territory required by Mine Arnaud covers woodlands where two companies detain *Contrats d'aménagement et d'approvisionnement forestiers* (CAAF). No logging is however projected within the mining property during the period 2008-2013.

Analysis of impacts

Preparation and site development during construction and operation will result in the loss of timber volumes representing a decrease of volumes allocated to forest industries holding CAAF. However, the recovery of these volumes of wood and its sale to the concerned beneficiaries of the forest management unit 094-51 will mitigate the impact.

5.3.4 Resort, leisure and tourism

Current Conditions

Fifteen chalets (camps) as well as some rough shelters (e.g. cache for big game hunting) are located in the study area and in its immediate vicinity. The majority of these camps are located between the eastern end of Lac Hall and in the baie des

Crans (Lac des Rapides) - northeast of the study area - or beyond its limits. Inside the project footprint, two other camps were identified in the extension of Clet Creek. They are mainly used for hunting and fishing.

In addition, the *Club de motoneige Ook Pik de Sept-Îles* has a relay along the Trans-Québec trail N°3, a little west of the lac à l'Anguille. The trail crosses the proposed mine site from east to west. The trail is primarily used by members of the local club (*Club de motoneige Ook Pik de Sept-Îles*), which included, as of January 2012, 539 members. Outside the winter period, most of the Trans-Québec trail n°3 is used by ATV riders, between Port-Cartier and rivière Moisie. ATV riders also use the corridors of power transmission and distribution lines. The *Club Quad VTT Les Nord-Côtiers* ensures the maintenance on the trail.

Note that Mine Arnaud was the owner of a mining lease on the territory of the Aylmer-Whittom Park. As Mine Arnaud did not intend to conduct exploration or exploitation on this land, it has taken steps to return his mining title to MRN and thus protect this land from mining development.

Analysis of impacts

Work related to mining infrastructure will require the removal or result in the loss of chalets. Mine Arnaud will provide financial compensation to the two owners to enable them, if they wish, to settle elsewhere on the territory. The owners can also use their camp until the progress of the project makes their departure necessary.

Following the analysis of alternatives for the snowmobile trail, Mine Arnaud will compensate for the loss of direct access to the Trans-Québec trail n°3 (TQ3) from Highway 138 by creating a new trail access, as requested by some residents of Canton-Arnaud. This new access will start in the lower part of Chemin Allard and will run westward to join the trail TQ3. Mine Arnaud will also develop parking spaces at the start of this new path. On a regular basis, Mine Arnaud will inform the associations responsible for the path to be relocated, namely the *Club de motoneige Ook Pik de Sept-Îles* (winter) and the *Club Quad VTT Les Nord-Côtiers* (all seasons), of the schedule of works. Mine Arnaud will also take measures to ensure the safety of trail users. At the end of the work, Mine Arnaud will repair if applicable, any damage to the trail.

5.3.5 Hunting, fishing and trapping

Current Conditions

Within the study area, wildlife related activities are mainly related to hunting and fishing by members of the zec Matimek, of which the southeastern part (Allard sector) is intersected by the project study area, as well as trapping within traplines registered with the MRN. The *Association chasse et pêche Sept-îlienne inc.* (ACPSI) administers this vast area where fishing, hunting and practice of non-traditional activities can take place. Access to the zec is from Highway 138 via either the path to the zec leading to the south of Lac Hall or the chemin Allard that crosses the claims held by Mine Arnaud, to reach the lakes located in the Sept-Îles hinterland. Due to its location in relation to the main registering station for the zec (lac Hall area) and terrain features, access through the chemin Allard causes some difficulty for managers, particularly with regard to the control of attendance and collection. In the south of the zec, most fishing activities (mainly for trout) take place on lac Hall and on the river of the same name.

Several other waterbodies within the boundaries of the study area or adjacent to it - including those of Allard sector - are also used for the practice of sport fishing. An area of ice fishing is located west of the Aylmer-Whitton Park, in the baie des Sept Îles, at the mouth of the rivière des Rapides. Hunting for big and small game (moose, hare and partridge) is also practiced in the area, especially by camp owners.

The project study area does not affect the limits of the beaver reserve Saguenay, Sept-Îles division, within which the Innu of Uashat mak Mani-utenam have exclusive rights for trapping furbearers. The practice of furbearer trapping is carried out on two types of territories, namely a so-called free area which extends from the coast to the southern boundary of the power transmission lines corridor from Labrador, and within the fur management unit (UGAF) 59 - Eastern part, on registered traplines, attributed to non-native trappers by MRN. Traplines n^o 09-11-0320 and to a lesser extent 09-11-0321 and 09-11-0326 overlap the study area.

Analysis of impacts

Construction and operation will result in the loss of areas for wildlife harvesting (hunting and fishing) in the Allard area of the ZEC Matimek. Trapping areas for trappers holding traplines 09-11-0321, 09-11-0326, and especially 09-11-0320 will be lost. As per the discussions initiated between various parties (zec Matimek and trappers), Mine Arnaud will implement compensatory measures for the loss of the Allard area of the zec. It will allow owners to use their camp until the progress of the

project make their departure necessary. Measures, such as the relocation of the snowmobile and ATV trail, and the fish habitat compensation program should have a positive impact on the control of territory and the quality of wildlife harvesting (especially for brook trout in Lac Hall). Mine Arnaud will keep in touch with the affected users to determine the extent to which operations can be a nuisance to the practice of activities (hunting, fishing and trapping) and, if necessary, to identify actions that could be taken to ensure the maintenance of good neighborly relations.

5.3.6 Infrastructure

5.3.6.1 Road Infrastructure

Current Conditions

The only road of importance along the North Shore coast is Highway 138, which stretches just over 800 km between Tadoussac and Natashquan. This road remains, even today, the only terrestrial access to neighboring regions and to the rest of the province. Highway 138 crosses the study area from side to side. From 2004 to 2008, the average annual daily traffic (AADT) on Highway 138, 1.7 km east of the exit road to Pointe-Noire, has fluctuated between 6,200 vehicles (2004) and 4,700 vehicles (2008). It comprised about 8 % of trucks. The importance of traffic on Highway 138, between the Sept-Îles and Pointe-Noire, at shift change for the Alouette smelter and Cliffs pelletizing plant is notable. According to several residents living in Canton-Arnaud, traffic flow during these period increase very significantly, to the point of becoming an irritant. Residents from Canton-Arnaud believe that the situation has deteriorated since the beginning of the construction of the La Romaine complex, a few years ago, and they anticipate it could deteriorate further due to proposed projects in the area of Pointe-Noire. In recent years, significant efforts have been made, notably by the *Ministère des Transports* (MTQ), *l'Agence de la santé et des services sociaux de la Côte-Nord* and the *Table de concertation en sécurité routière de la Côte-Nord*, to identify and understand impacts associated with heavy traffic on Highway 138.

Analysis of impacts

The impact assessment showed that the project would affect traffic on Highway 138 in the area of Canton-Arnaud. The concern raised by the community led Mine Arnaud to consider two access alternatives to the mine site to mitigate this impact. The community preferred the East option, but Mine Arnaud eventually had to choose the western option, which proves to be much less expensive.

In order to reduce traffic on Highway 138 mainly during the construction phase, the development of a workcamp by a private developer is envisioned. If this solution is abandoned, Mine Arnaud is committed to building its own workcamp. In addition, Mine Arnaud will modulate worker schedules to avoid, to the extent possible, that its workers drive on Highway 138 at the same time as other workers going to Pointe-Noire. Mine Arnaud will inform in advance the local population when transport activities related to the project may hinder or interfere temporarily with travel on Highway 138. Shuttles and carpooling are also considered as measures to mitigate increased traffic on Highway 138.

5.3.6.2 Rail Infrastructure

Current Conditions

The project study area includes a railway, operated by the *Compagnie de chemin de fer Arnaud (CFA)*, a subsidiary of Cliffs Natural Resources, based in Pointe-Noire. With a length of approximately 38 km, the railway connects facilities of Wabush Mines, located in the Pointe-Noire area, with the main line of the Quebec North Shore and Labrador (IOC - QNS&L) to a place called Sept-Îles Jonction (formerly Arnaud Jonction), a point about 12 km northeast of Sept-Îles. Each day, the trains make four round trips between Pointe-Noire and Sept-Îles Jonction, each of these trains count on average between 100 and 120 ore cars. For the period 2011 to 2015, CFA anticipates that the numbers of daily round trips will double or even triple. The amount of ore transported should quadruple. Therefore, CFA plans to increase the number of ore cars per train.

Analysis of impacts

On the mine site, the existing railway will be moved to the north, since it is located directly above the apatite deposit. An analysis of alternative relocation was carried out by Mine Arnaud. The relocation of the railway and its subsequent use increases the interest for transport by rail rather than by truck of the apatite concentrate to the port of Sept-Îles. This choice will help reduce traffic, diesel fuel consumption, and thereby, greenhouse gas emissions.

5.3.6.3 Port infrastructure

Current Conditions

Sept-Îles enjoys a strategic position at the entrance of the Gulf and Seaway St. Lawrence, which gives a special status and is a hub of international trade for goods in bulk. Sept-Îles is also the most important ore port in Canada. The port facilities are

located in the urban area, adjacent to the city, and on the other side of the bay, in Pointe-Noire. Port facilities, of both private (Iron Ore of Canada, Cliffs Natural Resources) and public property, include the Pointe-Noire dock, le *quai de la Relance* and the ferry dock rail. Each year, tens of millions of tons of cargo are handled, in addition to iron ore, alumina, aluminum, petroleum coke, lime stone and various other commodities, such as petroleum products.

Analysis of impacts

Mine Arnaud will handle and store the apatite concentrate at the port of Sept-Îles in order to make the shipping to Norway by the ships moored at the dock of the future multi-purpose of Terminal La Relance (berth n^o 40) in Pointe-Noire. The impact of these activities on port infrastructure and marine transportation was analyzed in the context of a complementary study to the EIS (Supplement n^o 3). Recall that the environmental assessment regarding the extension of the quai n^o 40 will be conducted by the Port of Sept-Îles.

The impact of Mine Arnaud was analyzed for the three phases of the project, construction, operation and closure. Sources of impact of the project which are subject of the environmental assessment are: the transfer station, storage silos, conveyors and transfer system; shipping ore within the immediate limits of baie des Sept Îles. Impacts were analyzed for the components of the physical (soil, water, air and noise environment) biological (vegetation, fish, fauna, bird and terrestrial) and human (local economy, land use, landscape and archaeological potential).

At any phase of the project, Mine Arnaud's activities at the site of port infrastructure will result in low, negligible or even null impact for all components of the environment considered.

5.3.6.4 Power transmission and distribution network

Current Conditions

The project study area is crossed by six power transmission and distribution lines grouped into two separate corridors. Moreover, in the context of the development of the hydroelectric complex on rivière Romaine, Hydro-Québec projects to route a portion of the electrical output of the Romaine-1 and all of the Romaine-2 output on the Quebec transport network by passing this new high-voltage line to the Arnaud substation located in Sept-Îles. The route chosen by the public company passes through the study area from east to west, along the south corridor comprising 735 kV and 161 kV lines already in place.

Analysis of impacts

Measures have been taken to avoid that vibrations generated during blasting affect the new line to be built by Hydro-Québec for connecting the powerhouses RO-1 and RO-2 (Complexe La Romaine) to the Arnaud substation as well as existing power transmission lines.

5.3.7 Housing

Current Conditions

Sept-Îles is currently facing a housing crisis (availability, cost, etc.). The reasons for this crisis are among others related to the number of projects already underway or planned in the region, particularly in relation to the increase in global demand for natural resources, including iron extracted from the North Shore and Labrador backcountry. Others also establish a link with the announcement of the *Plan Nord* by the Government of Quebec, although still few projects under the said plan have not yet materialized. Local economic actors explain the housing shortage in Sept-Îles first and foremost by the low number of construction starts since the middle of the previous decade, but also by the type of units that have been built. In fact, three quarters of residential units starts during the period 2006-2011 were single family homes while apartments and other rental housing accounted for about 15% of the total. City of Sept-Îles estimated in the spring of 2011 that about 300 additional housing should be built only to find the balance point and meet the needs of its citizens. Taking into account all known and planned projects in the city, it would need 800 new housing units. Aware of the situation and the difficulties it entails, the City of Sept-Îles has implemented an action plan to attract entrepreneurs and developers to combat the housing shortage that exists (see section 9.7.1 Impact Assessment for more details).

Analysis of impacts

The presence of Mine Arnaud workers at different stages of the project will result in increased pressure on the rental housing market and Sept-Îles, which is currently under pressure. To limit the potential impact of the presence of its workers during the construction phase, Mine Arnaud favors the implementation of temporary local solutions, such as the implementation of a workcamp by the authorities and economic actors in Sept-Îles. The company supports such initiatives and offers to the City of Sept-Îles its full cooperation in this matter. Mine Arnaud could build its own work camp if the previous solution is not in place before the start of the construction phase.

While hoping that the situation could evolve favorably by its entry into operation, Mine Arnaud undertakes to follow, together with local authorities, the adaptation of the rental housing market and the new context in order to establish where appropriate, a suitable strategy for the lodging and transportation of its workers.

With regards to the operation of the mine in 2015, Mine Arnaud still has the opportunity to make the necessary adjustments to minimize the impact on the rental market. Since it is difficult to predict the economic situation and the need for housing when the project will start its operations, Mine Arnaud intends to follow the housing situation in collaboration with the authorities of the City of Sept-Îles. Should the pressure on the rental market not decrease, despite the efforts of the public and private sectors to increase the supply of housing, a work camp may represent a temporary solution until the situation improves.

5.3.8 Health and quality of life

Current Conditions

A study on the determinants of health of the population affected by the project was completed by GENIVAR in 2012 (Supplement n^o. 4 to the EIS, Appendix 4).

Determinants of health are described by a set of indicators that identify the main characteristics of the receiving environment of the Arnaud Mining Project. The following features were documented: the state of population health (general, physical and psychological health), individual characteristics (socio-economic, lifestyle and behaviors); life environment (family, children care and school, workplace, community and neighborhood), systems (health and social services, municipal services, support to employment and social solidarity, housing assistance, public safety, land planning) and the global context (political and legislative context, socio-economic, demographic, environmental context).

In light of these data, there are several particular features of the receiving environment, in comparison with the situation in the whole of Quebec, including: the health status of the population of the region of the North Shore is generally less favorable; populations of the North Shore and the city of Sept-Îles have higher incomes; lifestyles of the residents on the North Shore are more problematic; sense of belonging is higher among residents of the North Shore; the population of the North Shore is more favorable to the development of the mining industry; populations of Uashat and Mani-Utenam are distinguished by a younger population, a higher proportion of the population without a high school diploma, a higher proportion of lone parents and employment indicators far less favorable.

The reader may consult this specialized study for more details on the health of the regional population.

Analysis of impacts

Health

Impacts on health determinants have been identified and evaluated by considering health in a dynamic perspective. According to this view, shared by the *Direction générale de la santé publique du ministère de la Santé et des Services sociaux*, health is the result of constant interaction between the individual and the environment and is not considered simply as the absence of disease. Thus, a particular health problem or a general health condition is associated with various individual, social, economic and environmental factors designated as determinants of health. The approach that has been used is borrowed from the conceptual framework developed by the *Direction générale de la santé publique*, which includes the determinants of health in four fields: individual characteristics, living environments, systems, and global context, such as described above.

The impact assessment of the proposed project was conducted with regard to the construction, operation and closure of the project. The evaluation was made on the aspects of the determinants of health concerns which were raised during the preliminary activities of information and consultation conducted by Mine Arnaud: risky sexual behavior, alcohol consumption, employment, income and employability of the population, housing and family environment, changing the living environment of residents bordering the project, social cohesion, road traffic, childcare services and education, social and health services, infrastructure and municipal services and demographic context.

To reduce the intensity of negative impacts apprehended and improve the positive effects of the project, Mine Arnaud has developed a series of measures to be implemented.

Quality of life

The project does not require the removal of any home. Mine Arnaud will however need to acquire parts of plots which are located south of the pit to allow notably the construction of the vegetated screening mound, which will mitigate the project's impacts on noise and the landscape. Compensation agreements with the owners are anticipated.

Mine Arnaud has planned to provide compensation as well as several options for residents and owners of Canton-Arnaud, proposing a framework for preliminary agreements and acquisitions in three defined areas.

On 20 June 2012, at a meeting with the residents of Canton-Arnaud, Mine Arnaud has proposed a preliminary agreement and acquisition framework in response to a majority of residents who emphasized not wanting to live with the uncertainty regarding the realisation of the project. Residents of Canton-Arnaud had until August 3, 2012 to submit their comments on the preliminary agreement and acquisition framework. Note that this is a voluntary approach, specific to each of the owners affected by this framework. Owners can also wait until the BAPE public hearings and even government decisions before starting the steps leading to an agreement. Except for extraordinary cases, Mine Arnaud will not finalize any agreement before obtaining the required certificates of authorisation for the project.

5.3.9 Landscape

Current Conditions

Baie des Sept Îles is by far the dominant component of the local landscape. This stems not only from its size, which places it at the forefront in the majority of visual fields of the coast, but also it creates an opening on the surrounding landscape. It is towards this bay, rather than towards the landscapes of the hinterland that the principal viewpoints along the coast are oriented (eg, Highway 138, Canton Arnaud houses, lookout of park Aylmer-Whittom, *Promenade du Vieux-Quai*, etc.). This prevails despite the industrial vocation of a significant portion of its periphery (eg, Pointe-Noire) and of the water body itself (presence of large vessels).

MRC de Sept-Rivières identifies the Highway 138 corridor as a panoramic corridor as well as a territory of aesthetic interest. In fact, Highway 138 along the coast of the St. Lawrence River provides an opportunity for visitors and residents to enjoy coastal, forest and mountain sceneries of great value, with a minimum of human intervention.

The study area was divided into nine units of landscape: Hilly plateau, Bumpy terrace, Hill flank, Peatlands, Islands and peninsulas, Baie des Sept Îles and St. Lawrence River, Industrial, Urbanized and Hydropower corridor. These units include significant visual fields and correspond to subsets of landscape types to which the physical, visual accessibility and intrinsic value gives a particular identity.

Analysis of impacts

The project will modify four landscape units: Bumpy terrace, Hill flank, Hydropower corridor and Urbanized (Canton-Arnaud).

Visual issues of the project are at two levels: local and regional. The local level considers a radius of about 1 km around the project. The regional level includes a radius greater than 1 km.

The visual analysis of the landscape was conducted as part of the EIS within a study area of 12 km by 15 km. A second analysis was conducted in the fall of 2012, within a study area extended to 30 km by 30 km. Its purpose was to consider the visual issues within the regional identity landscape that the baie des Sept Îles represents.

The main impacts on the landscape are:

- changing the landscape integrity of the four landscape units affected;
- the shifting and evolving nature of the landscape due to the evolution in time of the project;
- the modification of the topography.

Citizens' concerns in regard to the landscape were to preserve the natural beauty and maintain of the site and to maintain the tourist attraction of the bay.

Visual mitigation measures incorporated into the project considered these concerns:

- strategic location of project infrastructure;
- minimizing the footprint;
- construction of a screening mound in front of the entire pit to reduce the impact of construction and operation on the landscape and noise; this mound will be shaped according to the natural geomorphology of the receiving environment with an average height of 40 m; it will be gradually forested and developed in terraces;
- harmonious building color and controlled night lighting;
- reforestation of land outside of the footprint of operations;
- the gradual restoration of slopes on the full perimeter of the waste rock dump and tailings site;
- revegetation of dumps (specifically the south, west and east slopes) to limit the contrast with the surrounding wooded areas.

Mine Arnaud realised 11 photos-simulations of identity and local landscape, notably as a result, of demands from the community. These simulations, which are available in Supplement n^o 6 to the EIS on Mine Arnaud's website, were made from the following view points:

- the area of Pointe-Noire;
- *baie des Sept Îles*;
- *parc Le Vieux-Quai*;
- from Highway 138 to the screening mound;
- Highway 138;
- *Parc Aylmer-Whittom*
- *Jardins de l'Anse*;
- intersection of boulevards Laure and Montagnais;
- the point of Uashat;
- the residential tower, rue de Mingan;
- karting *Le Nordique*

The most visible components of the project from places usually frequented by the public are:

- the southern slope of the screening mound;
- the southern and eastern slopes of the overburden piles;
- the southern slopes of the waste rock dump;
- the upper benches of the north wall of the pit.

Visual simulations, however, allow determining that at the local level, the visual impacts of the project will be of low importance due to the implementation of many proposed mitigation measures. At the level of identity landscape (regional), the visual impacts of the project will also be of low importance.

The selected final rehabilitation strategies are the revegetation and the development of wildlife habitats, harmonizing with the surrounding landscape and proactive measures of good neighborliness.

From one perspective, the project may even enhance the existing landscape. Mitigation and restoration will establish a progressive remeshing of the eco-landscape which the final rehabilitation will complete with the goal of giving back to Sept Îles residents a site with an added value (Figure 17 Supplement n^o 6 to the EIS).

5.3.10 Archaeological Heritage

Current Conditions

The only known archaeological site of the study area is represented by the remains of an old whaling established southeast of Pointe Noire (OCAD-b). In total, 41 areas of Amerindian archaeological potential and 11 Euro-Canadian archaeological potential areas have been identified within or adjacent to the study area. One area of archaeological potential of Amerindian occupation, which extends along the axis of an unnamed creek, flowing from the east of the future pit towards the coast, is located in the project footprint.

Analysis of impacts

The project may result in the disturbance of an area of archaeological potential of Amerindian occupation. It could lead to the potential loss of significant elements of the archaeological heritage. However, an inventory of the potential zone before the start of work will ensure that the residual impact will be nil. Should the accidental discovery of archaeological sites occur elsewhere on the site, actions and protective measures required by the Ministry of Culture and Communications (MCC) will be implemented.

5.3.11 Navigation

Current Conditions

Rivière des Rapides, the largest tributary of the baie de Sept Îles, is used by boaters, including the members of the Les Prédateurs d'eau vive canoe club, for canoeing and kayaking. Within Zec Matimek, lac Hall and lac Gamache, among others, are used for canoeing, canoe-camping and kayaking. Streams in the study area are also considered secondary waterways according to criteria of depth and width, but are not used for navigation according to the land users (trappers, camp owner, and the Zec Matimek administrators).

Analysis of impacts

The choice of the west option for the construction of the access road to the mine, rather than the east option in the area of rivière des Rapides, ensures that the project will not affect any navigable waterway.

Table 6 Summary of residual impacts

Components	Source of impact ¹	Description of key impacts	Key mitigation and compensation ²	Significance of the residual impact
Physical environment				
Air Quality	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) (Cl) Extraction, handling, storage and processing of ore (Op) Decommissioning and reclamation of mining facilities (Cl) Final restoration of the site (Cl) 	<ul style="list-style-type: none"> Release of dust, fine particulates and exhaust gases from vehicles and machinery in operation 	<ul style="list-style-type: none"> Maintain the tailings wet Apply a dust suppressant or water frequently roads at the mine site Use a tarp on dump trucks transporting materials and circulating on the municipal and provincial road network and reduce the speed of trucks Use appropriate aggregates to limit dust Revegetate the tailings cells in the waste rock dump as soon as possible to limit dust by wind erosion Select equipment with good performance on the release of contaminants into the atmosphere 	Low to moderate
Noise climate	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) (Cl) Extraction, handling, storage and processing of ore (Op) Decommissioning and reclamation of mining facilities (Cl) Final restoration of the site (Cl) 	<ul style="list-style-type: none"> Increase noise levels caused by operations (truck traffic, operating machinery, construction activities and operation) 	<ul style="list-style-type: none"> Construct a screening mound along the south side of the pit Do not perform earthwork activities at night Position infrastructure as far as possible from homes Orient the openings of the building housing the crusher and the jackhammer to minimize noise transmission to homes Avoid the simultaneous use of the noisiest equipment Install mufflers and use rubber beds for trucks, insulate shovels acoustically , replace hammer crusher with less noisy ones, use a smaller bulldozer model for making the hill to work on the screen mound, use a less noisy model of articulated truck to work on the screen mound, install white noise back alarms on mobile equipments Regularly inspect machinery to ensure that the exhaust system is in good condition Establish a program to monitor noise level 	Low
Vibration	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) (Cl) Extraction, handling, storage and processing of ore (Op) Decommissioning and reclamation of mining facilities (Cl) Final restoration of the site (Cl) 	<ul style="list-style-type: none"> Vibrations caused by blasting potentially required during the phases of construction and operation 	<ul style="list-style-type: none"> Follow the blasting parameters recommended in SNC-Lavalin September 2011 report (Appendix 7.4.1 of the EIS). Implement the vibration monitoring program 	Low
Soils and surface deposits	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Cl) Storage and management of hazardous materials and fuels (Co) (Op) Extraction, handling, storage and processing of ore (Op) Decommissioning and reclamation of mining facilities (Cl) Final restoration of the site (Cl) 	<ul style="list-style-type: none"> Loss of land uses of the site following the development of mining infrastructure Compaction and soil erosion during construction and operation Modification of soil quality during the phases of construction, operation and closure 	<ul style="list-style-type: none"> Apply the following groups of mitigation measures: The integrity and revegetation (including management of overburden) The maintenance and machinery traffic Management of runoff and erosion control Management of oil Implement the progressive and final restoration plan 	Low

Table 6 Summary of residual impacts (continued)

Components	Source of impact ¹	Description of key impacts	Key mitigation and compensation ²	Significance of the residual impact
Physical environment (continued)				
Quality and use of groundwater	<ul style="list-style-type: none"> Use and maintenance of machinery (Co) (Op) Management of hazardous materials, fuels and waste on site (Co) (Op) Extraction, handling, storage and processing of ore (Op) Water management (Co) (Op) (Cl) Dismantling and recovery of mining facilities (Cl) 	<ul style="list-style-type: none"> Changes in the level and speed of groundwater flow 	<ul style="list-style-type: none"> Apply the following groups apply mitigation measures: Management of oil Surface drainage of mining sites and management of mining effluent Track water levels in observation wells installed during operation in order to validate the model results Conduct monitoring of groundwater quality in accordance with Directive 019 	Low to moderate
Hydrology and sediment regime of rivers	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Water management (Co) (Op) (Cl) Extraction, handling, storage and processing of ore (Op) Final restoration of the site (Cl) 	<ul style="list-style-type: none"> Changing the boundaries of the sub-watersheds and surface properties of runoff Reducing the catchment area of some streams Modification of the topography and surface drainage sub-basins Site Local change in the configuration of some sub-watersheds 	<ul style="list-style-type: none"> Implement a wastewater treatment plant to allow for the recirculation of much of the water to the concentrator Apply the following groups of mitigation measures: The integrity and restoration of vegetation The maintenance and circulation of machinery Management of runoff and erosion control Surface drainage of mining sites and management of mining effluent Road construction and development of water crossings Conduct the progressive reclamation of the accumulation areas during the operational phase to minimize the effects of the project on the hydrology of streams draining the mine site 	Moderate
Quality of surface water and sediment	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) Water management on site (Co) (Op) (Cl) Extraction, handling, storage and processing of ore (Op) Site restoration (Cl) 	<ul style="list-style-type: none"> Increase in suspended matter and woody debris in the water Modification of the physico-chemical composition of the water Contamination by spills of oils, hydrocarbons, solvents or other hazardous liquid Contamination by the use of dust suppressants and non-compliant by spreading icing in winter Return to natural conditions on the quality of surface water and sediment 	<ul style="list-style-type: none"> Implement a wastewater treatment plant to 1) recirculate a good portion of the waters to the concentrator and 2) the treatment of effluent prior to discharge Apply the following groups of mitigation measures: The integrity and restoration of vegetation The maintenance and circulation of machinery Management of runoff and erosion control Management of oil Surface drainage of mining sites and management of mining effluent Road construction and development of water crossings Perform at least once per season, monitoring visits to ensure the physical stability of containment structures and adjacent structures. Maintain a record indicating such visits and make it accessible at all times Perform a quality monitoring of surface water following the postoperation and postclosure phases in accordance with Directive 019 	Low

Table 6 Summary of residual impacts (continued)

Components	Source of impact ¹	Description of key impacts	Key mitigation and compensation ²	Significance of the residual impact -
Biological environment				
Terrestrial vegetation and wetlands	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) Progressive and final restoration of the site (Op) (CI) 	<ul style="list-style-type: none"> Loss of 1345 ha of land Loss of 41.7 ha of wetlands Introduction of invasive species Progressive revegetation sites 	<ul style="list-style-type: none"> Apply the following groups of mitigation measures: The integrity and restoration of vegetation The maintenance and machinery traffic Management of runoff and erosion control Management of oil Surface drainage of mining sites and management of mining effluent Road construction and development of water crossings Clean machinery and construction equipment in order to limit the spread of exotic and invasive plant species Implement the restoration plan of the site 	Low
Freshwater fish	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) Water management (Op) (CI) Labor supply and road traffic (Co) (Op) (CI) Progressive and final restoration of the site (Op) (CI) 	<ul style="list-style-type: none"> Permanent destruction of fish habitat (21.1 ha) Change in the quality of fish habitat Changing the habitat use by fish Disturbance of fish Increased fishing pressure on fish populations Gain of fish habitat 	<ul style="list-style-type: none"> Apply the following groups of mitigation measures: The integrity and restoration of vegetation The maintenance and circulation of machinery Management of runoff and erosion control Management of oil Surface drainage of mining sites and management of mining effluent Road construction and development of water crossings During the draining of water bodies: Lower the lake level slowly so that fish are concentrated in the deepest area of the lake, catch and relocate the fish. When filling the pit: Replace the tank water gradually to avoid resuspension of particles Revegetate the banks Create hydraulic connections with the natural environment to ensure free movement of fish Implement measures to offset the loss of fish habitat in consultation with DFO and stakeholders 	Low to moderate
Amphibians and reptiles	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Water management (Co) (Op) (CI) Use and maintenance of machinery (Co) (Op) Labor supply and road traffic (Co) (Op) (CI) Management of hazardous materials and fuels (Co) (Op) Extraction, handling, storage and processing of ore (Op) Progressive and final restoration of the site (Op) (CI) 	<ul style="list-style-type: none"> Loss of habitat and creating barriers to dispersal Changes in the hydrological regime Production of suspended solids and dust Mortality Noise Discharge of pollutants Habitat gain 	<ul style="list-style-type: none"> Apply the following groups of mitigation measures: The integrity and restoration of vegetation The maintenance and machinery traffic, especially with respect to noise Management of runoff and erosion control Management of oil Surface drainage of mining sites and management of mining effluent Road construction and development of water crossings Provisions are put in place to compensate for fish habitat and wetlands (Chapter 10) also represent gains of habitat for reptiles and amphibians 	

Table 6 Summary of residual impacts (continued)

Components	Source of impact ¹	Description of key impacts	Key mitigation and compensation ²	Significance of the residual impact -
Biological environment (continued)				
Avifauna	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) Construction of infrastructure and buildings (included in labor supply and traffic) (Co) Extraction, handling, storage and processing of ore (Op) Progressive and final restoration of the site (Op) (CI) Dismantling and recovery of facilities (CI) 	<ul style="list-style-type: none"> Destruction of bird nests Inconvenience to nests and adult birds Habitat loss Gain habitat, temporarily or medium term, the creation of bare areas and the construction of infrastructure, and in the longer term, after the restoration of most of the mine site 	<ul style="list-style-type: none"> To the extent possible, perform clearing, and soil stripping outside birds peak breeding period, which runs from May 1 to August 15 for the area, as recommended by the Service Canadian Wildlife Service (CWS) Dismantle buildings after birds breeding season to avoid destroying nests that may be present During restoration, create some ponds and small ponds in seeded areas In grass seeded area, install some nesting boxes for American Kestrels, a declining species in eastern continent 	Low
Mammals	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) Labor supply and road traffic (Co) (Op) (CI) Extraction, handling, storage and processing of ore (Op) Transportation of concentrate by rail (Op) Progressive and final restoration of the site (Op) (CI) 	<ul style="list-style-type: none"> Loss of habitat Disturbance by noise and human presence Mortality 	<ul style="list-style-type: none"> Apply the following groups of mitigation measures: The integrity and restoration of vegetation; The maintenance and circulation of machinery, especially with respect to noise Management of runoff and erosion control Management of oil Surface drainage of mine sites and management of mine effluent Road construction and development of water crossings 	Low
Shoreline habitat and marine fauna	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Water management (Co) (Op) (CI) Progressive and final restoration of the site (Op) (CI) 	<ul style="list-style-type: none"> Change in the quality of fish habitat at the mouth of the creek Clet Modification of habitat use by marine fauna at the mouth of some rivers 	<ul style="list-style-type: none"> Apply the following groups of mitigation measures: The integrity and restoration of vegetation The maintenance and circulation of machinery Management of runoff and erosion control Management of oil Surface drainage of mine sites and management of mine effluent Road construction and development of water crossings 	Low
Human environment				
Employment and Economy	<ul style="list-style-type: none"> Labor supply and road traffic (Co) (Op) (CI) 	<ul style="list-style-type: none"> Creation or retention of jobs Stimulation of the local economy 	<ul style="list-style-type: none"> Create a committee to maximize regional benefits Reach an impact and benefits agreement (IBA) with Innu Uashat mak Mani-Takuaikan utenam (ITUM) Publish and distribute, prior to the start of construction and operations, a comprehensive list detailing the nature of the 330 jobs to be created by the project Include regional subcontracting clauses in contracts Apply procedures and develop a strategy to encourage the hiring of labor and the purchase of goods and services on the North Shore Set aside some contracts for the region, provided that competition is ensured Ensure that a contact person facilitate relations between Mine Arnaud, local business people, specialized companies from outside the region 	

Table 6 Summary of residual impacts (continued)

Components	Source of impact ¹	Description of key impacts	Key mitigation and compensation ²	Significance of the residual impact -
Human environment (continued)				
Suburban and rural	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use and maintenance of machinery (Co) (Op) Labor supply and road traffic (Co) (Op) (CI) Extraction, handling, storage and processing of ore (Op) Presence of buildings and infrastructure (Op) Progressive revegetation (Op) Dismantling and recovery facility (CI) final site reclamation (CI) 	<ul style="list-style-type: none"> Encroachment on land belonging to residents 	<ul style="list-style-type: none"> Develop a property acquisition program which ensures fair and equitable treatment of all owners Implement appropriate mitigation and compensation measures which apply to the following: camp owners, snowmobile and quad, hunting, fishing, and trapping» 	Moderate
Logging and mining	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) 	<ul style="list-style-type: none"> Volume of timber cut in the grip represent a reduction in volumes allocated to forest industries holding supply contracts and forest management (CAAF) 	<ul style="list-style-type: none"> Recover and sell merchantable wood to the beneficiaries of UAF 094-51 	Nil
Recreational use, snowmobile and quad	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Labor supply and road traffic (Co) (Op) (CI) 	<ul style="list-style-type: none"> Displacement or loss of camps Loss of a portion of the snowmobile trail and ATV 	<ul style="list-style-type: none"> Continue regular exchanges between the parties (eg, information and consultation on the criteria for assessing property value, negotiation schedule, schedule for the implementation of measures, information on the progress of the project, etc.). Pay compensation to both affected camp owners to enable them, if they wish, to re-establish elsewhere on the territory Allow camp owners to use their camp until the progress of the project makes their departure necessary On a regular basis, keep the associations responsible for trail maintenance, the Club de motoneige Ook Pik- (winter) and the Club quad ATV les Nord-Côtiers (all seasons), informed of the work schedule Take steps to ensure the safety of trail users (e.g. avoid blocking the trail, provide appropriate signage at intersections with paths set up for the purposes of the construction, and inform users, if some works require temporary closure of a segment of trail along access roads) At the end of the work, repair if necessary, any damage to the trail Relocate the snowmobile and ATV trail As requested by some residents of Canton-Arnaud, compensate for the loss of direct access to the snowmobile trail Trans-Québec No. 3 (TQ3) from Highway 138 by creating a new trail access trail starting in the lower part of Chemin Allard and heading west to join the TQ3,. Build a parking at starting point of this new trail 	Low
Hunting, fishing and trapping	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use of machinery and circulation (Co) (Op) Labor supply and road traffic (Co) (Op) (CI) Extraction, handling, storage and processing of ore (Op) Presence of buildings and infrastructure (Op) Progressive and final restoration of the site (Op) (CI) Dismantling and recovery facility (CI) 	<ul style="list-style-type: none"> Loss of segments wildlife (hunting, fishing) practiced in the area of the ZEC Allard Matimek Loss of mineable areas for trappers holding traplines no. 09-11-0321, 09-11-0326 and especially 09-11-0320 	<ul style="list-style-type: none"> In agreement with the results of the discussions initiated between various parties (trappers and Zec Matimek) implement measures to compensate for the loss of the Allard area of the ZEC. Allow owners to use their camp until the progress of the project makes their departure necessary Some measures taken previously, such as the relocation of snowmobile and ATV trail, or the program to compensate fish habitat should continue to have positive effects on the control of the territory and the quality of wildlife resource (especially trout in Lake Hall) Maintain regular contact with the users to determine the extent to which mine operations can be a nuisance to activities practice (hunting, fishing and trapping) and, if necessary, identify actions that could be taken to maintain good-neighborly relations 	Low (ZEC) To moderate (trappers)

Table 6 Summary of residual impacts (continued)

Components	Source of impact ¹	Description of key impacts	Key mitigation and compensation ²	Significance of the residual impact
Human environment (continued)				
Infrastructure	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Labor supply and road traffic (Co) (Op) (Cl) 	<ul style="list-style-type: none"> Increased traffic on Highway 138 	<ul style="list-style-type: none"> Prioritize and support the implementation of local temporary solutions including the development of a workcamp by local authorities and the economic actors, and ensure full cooperation in this matter to the City of Sept-Îles Inform in advance the local population of when project related transport activities may temporarily impede or interfere with travel on Highway 138 Study the possibility of modulating the workers' schedules so that it does not coincide (or to the least extent possible) with those of workers in Pointe-Noire 	
Housing	<ul style="list-style-type: none"> Labor supply and road traffic (Co) (Op) (Cl) 	<ul style="list-style-type: none"> Increased pressure on the housing market and rental Sept-Îles 	<ul style="list-style-type: none"> Prioritize and support the implementation of local temporary solutions including the development of a workcamp by local authorities and the economic actors, and ensure full cooperation in this matter to the City of Sept-Îles If no other option is available for the start of the construction phase, build a camp with a capacity sufficient to accommodate Mine Arnaud workers Follow, together with local authorities, the adaptation to the new context of the rental and housing market in order to establish, if necessary, an appropriate strategy for staff accommodation 	
Health and quality of life	<ul style="list-style-type: none"> Labor supply and road traffic (Co) (Op) (Cl) 	<ul style="list-style-type: none"> Increased traffic of health services, and security and other changes in the quality of life 	<ul style="list-style-type: none"> Implement the measures identified in Table 36 of the Supplementary study to the environmental impact statement on health determinants. Track health determinants (risk behaviors, in social services and health, housing, traffic, Canton-Arnaud's neighborhood, and social cohesion) 	
Landscape	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Extraction, handling, storage and processing of ore (Op) Presence of buildings and infrastructure (Op) Progressive and final restoration of the site (Op) (Cl) 	<ul style="list-style-type: none"> Gradual transformation of natural landscapes into industrial landscapes, and over large areas 	<ul style="list-style-type: none"> Construct a screen mound along the south side of the pit Mark and respect the zones covered by clearing and site preparation and development activities Maintain, wherever possible, wooded buffer zones between the construction areas and places where the main observers of the receiving environment are located Preserve, where possible, existing woodlots located between Highway 138 and the mine site Revegetate the accumulation areas (specifically the southern slopes, west and east) to limit contrasts with the surrounding wooded areas Stabilize cut and fill slopes through technics which will be harmonize as much as possible with the natural environment Use lighting directed towards the ground (and safe for workers) to limit light pollution Visually integrate buildings and related equipment through the use of colors and tints harmonious with the landscape Gradually restore sites throughout the mine life 	Negligible to low
Archaeological Heritage	<ul style="list-style-type: none"> Preparation and site development (Co) (Op) Use of machinery and circulation (Co) (Op) Labor supply and road traffic (Co) 	<ul style="list-style-type: none"> Disruption of a potential area of Amerindian Potential loss of significant elements of the archaeological heritage 	<ul style="list-style-type: none"> Before the start of work, conduct a comprehensive archaeological survey of the Amerindian No. 13 area of archaeological potential In the event of the accidental discovery of archaeological sites during construction, apply the following actions and temporary protection measures: <ul style="list-style-type: none"> Stop work in order not to disrupt or alter the site Immediately notify the site manager and take the necessary steps to protect the site without delay Notify the Minister Conduct a qualitative assessment of the site Suspend construction on the site of the discovery until the MCC has given permission to continue 	

¹ (Co) Construction phase (Op), Operation phase (Cl), Closure phase.

² Groups of mitigation and compensation measures are presented in Table 12.2 of the EIS.

6. CONSIDERING THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT

According to the *Loi sur le développement durable* adopted in 2006, "sustainable development" means development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development is based on a long-term vision that takes into account the inextricable nature of the environmental, social and economic development activities.

MDDEP's directive for the project identifies three main objectives of sustainable development which must apply to the project:

- maintaining the integrity of the environment;
- improving social equity;
- improving economic efficiency.

Mine Arnaud is committed to working with local communities to maximize the positive impact of its activities, minimize its impact on the environment, protect the health and safety of its employees and citizens while building an economically viable project.

Note that the City of Sept-Îles, with the help of the *Chaire en éco-conseil de l'Université du Québec à Chicoutimi*, is currently conducting a detailed analysis of sustainable development for the Arnaud mining project (for details, see <http://synapse.uqac.ca/mine-arnaud/>). The principles of sustainable development have been studied for each phase of the project by Mine Arnaud, from construction to post-closure (Table 7), and adherence to them is reflected, among others, by establishing an environmental policy, which is presented at the beginning of this summary.

Table 7 Respect for the principles of sustainable development in the Arnaud mining project

Principle	Elements of the project respecting the principles
Health and quality of life	<ul style="list-style-type: none"> • Commitments and mitigation measures targeted to the potential impacts on the human environment • Integration and social integration plan taking into account the EIS, the process of public consultation and concerns
Social equity and solidarity	<ul style="list-style-type: none"> • Mine Arnaud commitment to conclude an agreement on the impacts and benefits (ERA) with the Aboriginal community of Uashat mak Mani-Utenam • Mine Arnaud commitment to discuss with interested residents the terms of an acquisition process respectful of the parties involved
Environmental protection	<ul style="list-style-type: none"> • Environmental policy and environmental management manual • Compensation and mitigation measures of impacts on the physical, biological and human environment
Economic efficiency	<ul style="list-style-type: none"> • Maximizing economic benefits through the formation of a <i>Comité de maximisation des retombées économiques</i> (COMAX) • Community and social engagement program
Participation and commitment	<ul style="list-style-type: none"> • Pre-consultation process with participatory workshops focused on citizen participation • Advisory and Monitoring Committee composed of representatives of the community throughout the life of the project
Access to knowledge	<ul style="list-style-type: none"> • Mine Arnaud commitment to make available, disseminate and synthesize the literature • Disseminating the results of environmental monitoring with the people and organizations and institutions wishing to build reference databases
Subsidiarity	<ul style="list-style-type: none"> • Formation of an Advisory Committee composed of community representatives • Municipality-Enterprise Table
Partnership and collaboration with governments	<ul style="list-style-type: none"> • Meetings and discussions with government agencies at all stages of the project • Respecting the legal framework and government policies
Prevention	<ul style="list-style-type: none"> • Prevention program and risk management plan (technological, health, safety and environment) and emergency plan
Precaution	<ul style="list-style-type: none"> • Continuous improvement of risk management processes and application of the ALARP principle (As Low as Reasonably Practicable)
Protection of cultural heritage	<ul style="list-style-type: none"> • Project design to reduce its impact on activities related to land use • Mine Arnaud commitment to reduce the impact of the project on the landscape
Preservation of biodiversity	<ul style="list-style-type: none"> • Compensation and mitigation measures of impacts on physical and biological components
Respect of the support capacity of ecosystems	<ul style="list-style-type: none"> • Environmental surveillance and monitoring program before, during and after the project
Responsible production and consumption	<ul style="list-style-type: none"> • 100% recirculation of the water used for industrial purposes to minimize the use of water • Mineral processing and tailings management minimizing environmental impacts
Polluter pays principle	<ul style="list-style-type: none"> • Compensation programs for wetlands and fish habitat affected
Internalization of costs	<ul style="list-style-type: none"> • Integration of the costs of compensation measures and specific mitigation for impacts on physical, biological and human project

7. CUMULATIVE EFFECTS

Environmental impacts of human actions and projects past, present and future are studied together to determine the interaction between them and the presence of potential cumulative effects on the environment. The cumulative effects analysis in this study is based on the method described in the Cumulative Effects Assessment Practitioners' Guide of the Canadian Environmental Assessment Agency. The assessment includes the following steps:

- determining the scope of the study, which defines, based on regional concerns, valued environment and social components (VESC) and their spatial and temporal boundaries;
- description of actions, projects or events, past, present and future with a probable interaction with VESC;
- analysis of potential cumulative effects affecting VESC by defining, for each, the baseline, historical trends and cumulative effects;
- developing mitigation measures for cumulative effects.

The environmental analysis of some components of the project has demonstrated the potential for cumulative effects with other projects or activities in the area of Pointe-Noire, including La Romaine hydropower project, port infrastructure projects, industrial projects and other mining projects.

Housing issues related to these other projects in the region are those that are most problematic in the short and medium term. Aware of the situation and the difficulties it entails, the City of Sept-Îles has implemented an action plan to attract entrepreneurs and developers to combat the current housing shortage. This plan has several components including and relies on the success of several initiatives to mitigate the cumulative effect on housing. Thus, in 2012 and 2013, over 200 new rental units will be added to local real estate. This will probably not fully cater to demand. This is why various alternatives, including the possible establishment of a workers camp, are currently under study in order to find a solution to the housing problem related to temporary construction sites known and to come in the region. Among these alternatives, note that the use of a cruise ship to ensure the accommodation of workers was discontinued in November 2012.

The effects of the project in combination with the increased activity in the area of Pointe-Noire and projects related to La Romaine will probably have an impact on traffic on Highway 138 in Sept-Îles, but it is difficult to quantify this impact in the absence of precise data for the majority of these projects. Given the importance of

the projects announced in regard to the number of workers, it remains that the potential cumulative impact should be the object of mitigation measures and monitoring on the part of all stakeholders.

The effects of the Arnaud mining project combined with those of these projects will also have an impact on the demand for health and social services. This cumulative impact will also be subject to mitigation measures and monitoring on the part of all stakeholders.

Air quality, although it is also affected by the arrival of new industrial and mining players, is not a major source of cumulative effects because of the short distance of dispersal of air pollutants and the fairly large area of the city. Mine Arnaud, however, is committed to supporting the City of Sept-Îles in taking charge of this problem by providing the relevant data and participating in meetings.

Moreover, the establishment of a *Table de concertation sur la qualité de l'air à Sept-Îles*, which began in June 2012, was officially announced at the end of October 2012. The City of Sept-Îles, *la Corporation de protection de l'environnement, l'Agence de la santé et des services sociaux de la Côte-Nord, Aluminerie Alouette, le Centre de santé et des services sociaux de Sept-Îles, Cliffs Mines Wabush, le Comité de défense de l'air et de l'eau, la Compagnie minière IOC, le Conseil régional de l'environnement de la Côte-Nord, Développement Économique Sept-Îles* and Mine Arnaud participate. The *Table* is also assisted by representatives of MDDEFP. The creation of this table demonstrates the willingness of its members to work together in the field of environment and sustainable development. The *Table* will allow its players to get a clear, comprehensive and integrated vision of air quality in Sept-Îles.

As part of his project, Mine Arnaud will also establish a program for monitoring air quality in the vicinity of its facilities to perform measurements before the start of the project and during operation. This monitoring will thus validate the modeling results of the effects of the project on air quality, and also to identify any cumulative effect in the Canton-Arnaud.

8. ENVIRONMENTAL, SOCIAL AND TECHNOLOGICAL RISKS MANAGEMENT

8.1 Environmental and Social Management Plan

Mine Arnaud is committed to developing a plan for environmental and social management which will aim to:

- comply with the regulatory framework applicable to the project;
- mitigate the negative impacts of the project on the biophysical and human environment;
- ensure surveillance of the activities and monitoring of project impacts (see Chapter 14 of the EIS for details);
- to make corrections or improvements required as appropriate;
- maximize the positive impacts of the project.

The environmental and social management plan and will ensure the implementation of best practices to mitigate or enhance the environmental and socioeconomic impacts associated with the project. It will be mainly based on the ISO 14001 environmental standard that is internationally recognized. This plan will bring together in one document the details of:

- mitigation measures, requirements, specific environmental management plans and procedures to be implemented to avoid or mitigate negative impacts on the social and the natural environment;
- indicators and control measures;
- roles and responsibilities of various stakeholders in the field of environmental and social management.

Specific management plans will be developed to minimize residual impacts identified in the impact assessment, as well as to meet the company's and regulatory requirements:

- management of air emissions;
- noise management;
- vibration management;
- pollution prevention;
- management of waste and hazardous materials;
- social integration and inclusion plan.

Remember that no external water source will be necessary for the proper operation of mining activities, because water requirements for the processing of ore will be provided by recirculating industrial wastewater. The project thus maximizes the reuse of water and prevents the removal of water from the site.

In addition, all site water will be collected and sent to the accumulation basin and to be treated before being returned to the concentrator, or discharged into Clet Creek. This water treatment ensures that the water meets applicable criteria and standards.

A water management plan was developed in 2012 to ensure continued operations in the context of environmental protection, taking into account the highly fluctuating climatic conditions, on an annual basis. The main objectives of the water management plan are:

- ensure a reliable supply of water to the process;
- avoid withdrawals of fresh water from outside the project footprint;
- maximize the discharge of non-contact water in the receiving environment;
- maximize reuse in the process of contact water (closed circuit) and minimize the discharge of mine effluents;
- facilitate mining operations by limiting the entry of water into the pit and by quickly removing any input from ground water infiltration or rainfall;
- ensure sediment control;
- collect and treat any mining water which could affect the quality of the receiving environment;
- minimize the contact of rainwater with tailings by the progressive recovery of the cells.

This plan will be optimized progressively as the level of project definition will evolve to the level of detailed engineering. To compensate for the loss of water in the tailings or by evapotranspiration, sources of supply water at the processing plant will include, in order of priority: water from tailings cells (contact water); untreated water from the accumulation basin (contact water); mine water (pumped from the pit to keep it dry).

Surveillance and monitoring programs specify the proposed means and mechanisms to ensure compliance with legal and environmental provisions and with the environmental objectives of the project.

The surveillance program (Section 14.1 of the EIS) thus allows to check the progress of the work and functioning of the equipment and facilities in place and to monitor any environmental disturbance caused by the realization (noise, vibration, dust), operations (air emissions, mining effluent) or post-closure phase of the project (integrity of structures). On the other hand, it also aims to respect the laws, regulations and other environmental considerations developed in the plans and specifications. It will cover the following areas:

The environmental monitoring program for its part allows to measure, observe and document any change (natural or related to the project) of the environment in relation to baseline conditions, verify the accuracy of the environmental assessment and evaluate the effectiveness of mitigation measures (Section 14.2 of the EIS).

The monitoring program for Arnaud mine project covers:

- the quality of ambient air;
- noise levels;
- vibration;
- hydrological regime (flow rates and water levels) of the creeks affected by the project, including Clet Creek;
- the level and quality of groundwater;
- the quality of surface water and sediments;
- benthos and fish;
- revegetation;
- land use;
- determinants of health (risk behaviors, situation of social services and health, housing, road traffic, Canton-Arnaud neighborhood and social cohesion);
- adaptation of the real estate and rental market and support to local initiatives implemented by the City of Sept-Îles and other stakeholders in the community;
- economics and employment.

Mine Arnaud foresees the establishment of an advisory and monitoring committee representative of the community to see to the smooth running of the program and its compliance with the objectives.

8.2 Management of technological risk and emergency plan

8.2.1 Technology risk management

Mine Arnaud is committed to making health and safety a priority and a constant concern. To achieve this goal, it will prepare the following documents:

- a program of risk prevention in the construction phase and another in the operation phase;
- fire protection system;
- technological risk assessment of the project;
- management system for health and safety, accident prevention, environment and risks;
- hygiene program for working to ensure that workers are not exposed to contaminants or physical agents that may affect their health or physical integrity;
- security measures.

8.2.2 Emergency Plan

The risk of accident is always present despite all preventive measures put in place. Mine Arnaud is not immune to a fault or error which would result in a negative impact on mining operations, local users or the environment.

Although the focus must first be on prevention rather than emergency measures, the nature of human activity is contributing to that accidents may occur, and do occur. Nonetheless, risks, losses and damages caused by such accidents can be minimized through preparation or planning of appropriate emergency measures to apply.

The Emergency Plan (EP) identifies certain accidents that may occur to facilitate the development of systems to respond appropriately in these circumstances. Competent intervention requires a thorough understanding of the roles and practices of each participant. The complexity of the EP varies greatly depending on the type and severity of the emergency. The EP contains sufficient detail to ensure timely access to critical information needed in an emergency. The amount of information provided by the EP depends on the assessed risk.

Since each emergency is generally unique, the EP presented in Appendix 15.8.1, *Plan préliminaire des mesures d'urgence*, of the EIS should be seen as a tool and not an end in itself, a safe and logical approach, based among others on the overall experience, must be exercised. This version of the EP is preliminary and will be updated during the detailed design of the facilities.

You have questions or comments about the Arnaud mine project?

We invite you to:

- visit the project website: www.minearnaud.com
- consult the project's documentation
- contact Kateri C. Jordan, Director of community relations and communication

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