Agence canadienne d'évaluation environnementale | Canadian Environmental Assessment Agency

Arnaud Mining project

Draft Environmental Impact Assessment and Comprehensive Study Guidelines Established Under the *Canadian Environmental Assessment Act*

Canadian Environmental Assessment Registry Reference Number: 12-03-63926

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TABLE OF CONTENTS

PART 1 : BACKGROUND

1 INTRODUCTION

The purpose of this document is to identify for the proponent the information requirements for the preparation of an environmental impact statement (EIS) for the proposed Arnaud Mining Project, which will be assessed under the comprehensive study process pursuant to the *Canadian Environmental Assessment Act* (the Act). These guidelines specify the nature, scope and extent of the information required.

The project is subject to a provincial environmental impact assessment pursuant to section IV.1 of the *Quebec environment quality act.* The Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) has issued guidelines for the conduct of the impact assessment by the proponent. The guidelines issued by the Provincial Administrator for the preparation of the impact assessment covers most of the federal authorities' requirements.

The federal guidelines were prepared taking into consideration the MDDEP guidelines. The Proponent is encouraged to develop a single body of documentation that satisfies both federal and provincial environmental assessment requirements as per the *Canada-Quebec Agreement on Environmental Assessment Cooperation* (2004).

The proponent will prepare and submit an EIS that identifies the potential adverse environmental effects of the project, including cumulative effects; identifies technically and economically feasible measures to mitigate those effects; and evaluates whether the proposed project will result in any significant adverse environmental effects.

While the EIS Guidelines provide a framework for preparing a complete EIS, it is the responsibility of the proponent to provide sufficient data and analysis on any potential environmental effects of the project to permit proper evaluation by the Canadian Environmental Assessment Agency (the Agency), expert and regulatory departments, Aboriginal groups, and the public. The EIS Guidelines describe the minimum information requirements, but give the proponent the flexibility to choose the most appropriate methods for compiling and analyzing data for the EIS. The EIS Guidelines may be amended as more information about the project and the environment becomes available or should the Project change.

1.1 Proposed project

According to the information received, the proponent proposes to develop an open-pit apatite and magnetite mine, with an anticipated operating life of 15 to 30 years. The anticipated supply of ore to the concentrator is 30,912 t/d, representing an estimated average production of apatite concentrate of 3,542 t/d and of magnetite concentrate of 6,646 t/d. Production is estimated based on an assumption of 350 days of production a year.

The mining property is located approximately 15 km west of downtown Sept-Îles, in Arnaud Township, on the North Shore of Quebec. The proponent is a joint venture formed by

Investissement Québec and Yara International ASA. The deposit will be mined as an open-pit operation. The Aboriginal community of Uashat Mak-Maliotenam is located several kilometres from the mining site.

The project includes all the activities and works associated with construction, operation and decommissioning (closure and post-closure), including the following activities and components:

- Mining site including an open pit, an ore processing plant including an ore crushing, heaping and loading facility, waste rock dumps, a tailings site, including cells for storing the magnetite concentrate and the apatite flotation waste, a complex of water management facilities (polishing pond, wastewater treatment, pump for mine drainage water, etc.), and diesel energy generation facilities
- Ore processing facility: the concentrator will be divided into four main areas: crushing, ore flotation, magnetic separation, reagent storage and concentrate loading sections
- A system for loading the apatite concentrate for shipment to the port of Sept-Îles (train, truck or other mode)
- Mine water pumping and recovery system. The water will be directed to a basin for recirculation in the ore processing plant and/or treated before being released into the environment
- An explosives magazine
- Service buildings (administration, equipment maintenance, etc.)
- A road network including:
    - A 4.5 km long by 10 m wide access road to the provincial highway 138
    - Roads linking the operating pit to the waste rock and overburden dumps as well as to the tailings site will be designed to support off-road trucks, with a total length of 3 km and approximate width of 17 m
- Relocation of a section of the Arnaud railway, over a length of approximately 8.5 km
- Construction of a fuel depot of approximately 2,500 m^2, for the fuel and chemical storage facilities

The project also requires the construction of facilities for handling, storage and transhipment of the apatite concentrate to the Sept-Îles Port Authority property (Pointe Noire sector). The titaniferous magnetite concentrate produced will be stored at the mining site until a market has been identified. The project also includes the necessary infrastructure for hauling the ore, and the electrical system supplying the processing plant and the mine.

This information is based on the project description provided by the Proponent in January, 2011 and additional information provided on October, 2011, (correspondences dated October 3rd, 5 and 13, 2011) available on the Major Projects Management Office online tracker: http://www.mpmo-bggp.gc.ca

1.2 Environmental Assessment Context and Process

Under section 5 of the *Canadian Environmental Assessment Act*, an environmental assessment is required because, for the purpose of enabling the project to be carried out in whole or in part because the following permits and Authorizations may be required:

- Canadian Transportation Agency pursuant to paragraph 98 of the *Canada Transportation Act*
- Governor in council, decision to modify the *Metal Mining Effluent Regulation(MMER)* to authorize to deposit of a deleterious substance into a tailings impoundment area by the addition to the Schedule 2 of the MMER, the addition of a tailings impoundment area pursuant to paragraphs 36(5)(a) to (e) of the *Fisheries Act*
- Fisheries and Oceans Canada (DFO) pursuant to paragraph 35(2) of the Fisheries Act ;
- Transports Canada (TC) pursuant to sections 5(1) ans (2) of the Navigable water protection Act (NWPA) and pursuant to certain parts of section 5(1) and (3)

The Sept-îles Port Authority (SIPA) will lease by contract, land located within the Port de Sept-Îles property in the Pointe Noire Sector, for the installation of facilities for handling, storage and transhipment of the apatite concentrate. Pursuant to section 3 of the *Canada Port Authority environmental Assessment Regulations*, the SIPA must ensure an environmental assessment is completed before the lease or transfer of a land as prescribed in paragraph 5(1) c) of CEAAct. Natural Ressources Canada (NRCan), Health Canada (HC) and Environnement Canada (EC) have confirmed owning relevant expertise for the environmental assessment.

The Agency determined that the project is subject to a Comprehensive study since some components of the Project as proposed by the Proponent are described in the *Comprehensive Study List Regulations* of the *Canadian Environmental Assessment Act*, under the following sections,

- 10. the proposed construction, decommissioning or abandonment of a facility for the extraction of 200,000 m^3/a or more of ground water or an expansion of such a facility
- 16. The proposed construction, decommissioning or abandonment of (a) a metal mine, other than a gold mine, with an ore production capacity of 3 000 t/d or more

In addition, it is a major resource project requiring the involvement of the Major Projects Management Office (MPMO). The MPMO will be kept informed of the work completed within the EA.

1.3 Comprehensive study process[1]

In accordance with section 11.01 of the Act, the Agency will perform the duties and functions of the responsible authority in relation to the environmental assessment of the Arnaud Mining Project. The Agency will work closely with the federal authorities to coordinate their participation in the environmental assessment process and facilitate communication and cooperation between them and the other participants for the purpose of preparing the comprehensive study report (CSR).

To perform the analysis of the project, the Agency has established a federal environmental assessment committee (the federal committee) made up of representatives of the above mentioned federal organizations implicated in the environmental assessment of the project. Other departments may be added if necessary.

[1] See Appendix 1 for diagrams of the comprehensive study.

The federal committee has established the scope of the environmental assessment to guide the the proponent's impact assessment (see section 5.3 below). The proponent will submit its impact assessment statement evaluating the environmental effects of the project to the Agency for review and comment. During its analysis, the Agency will consult the public and the aboriginal communities. A comprehensive study report detailing the conclusions of the Agency on the environmental effects of the project will then be prepared. This report will be submitted to the Minister of the Environment (the Minister) and will also be made available for public review and comment.

The Minister will review the comprehensive study report, the summary of the consultation of Aboriginal groups, the results of the consultation, and public concerns. If the Minister is of the opinion that additional information or specific actions are needed to address the concerns of the public or Aboriginal groups, the Minister may require the Agency, the federal authorities or proponent to ensure that additional information is gathered or that measures are taken to resolve those issues.
Once all the necessary information has been provided, the Minister will issue an environmental assessment decision statement. This statement sets out the Minister's opinion as to whether the project is likely to cause significant adverse environmental effects, taking into account the implementation of the mitigation measures and follow-up program that the Minister considers appropriate.

Once the Minister has issued an environmental assessment decision statement, the project is referred back to the federal authorities for their respective decisions under section 37 of the Act. The federal authorities can then take appropriate regulatory actions, such as issuing permits, licences or approvals, depending on the outcome of the environmental assessment.

2 GUIDING PRINCIPLES

2.1 Environmental Assessment as a Planning Tool

Environmental assessment (EA) is a planning tool used to ensure that projects are considered in a precautionary manner in order to identify its possible environmental effects, to propose measures to mitigate adverse effects and predict whether there will be likely significant adverse environmental effects after the measures are implemented. The preparation and review of the EIS are essential components of the EA process. It also serves the purpose to encourage decision makers to take actions in sustainable development perspective, and thereby achieving or maintaining a healthy environment and a prosper economy.

2.2 Public participation

One of the purposes of the Act (Section 4 (1)) is to ensure opportunities for timely and meaningful public participation throughout the EA process. The public will have the opportunity to comment on the project and the conduct of the comprehensive study, the environmental impacts identified by the Proponent and the Agency's comprehensive study report.

Meaningful involvement in the EA takes place when all parties involved have a clear understanding of the proposed Project as early as possible in the review process. The Proponent is encouraged to consult the public as early as possible, during the planning stages of the project.

2.3 Aboriginal Consultation

The Proponent must ensure that it engages with Aboriginal people that may be affected by the Project and that have asserted or established Aboriginal or treaty rights. In preparing the EIS, the Proponent must ensure that Aboriginal people have access to the information that they require in respect of the Project and how the Project may impact them. The Proponent is required to provide up-to-date information describing the project to the relevant Aboriginal groups, and especially to the communities likely to be most affected by the Project. The Proponent shall also involve Aboriginal groups in determining how best to deliver that information (e.g. the types of information required, formats, and the number of community meetings required) and explain the results of the EIS in a clear direct manner to make the issues comprehensible to as wide an audience as possible.

When the Crown contemplates conduct that may have potential adverse impacts on established or potential Aboriginal and treaty rights, it has a legal duty to consult with Aboriginal groups before making a decision to proceed with the proposed conduct. For the purposes of the federal Crown consultation, the Proponent is required to describe in the EIS how the concerns respecting Aboriginal groups shall be addressed. That description shall include a summary of discussions, the issues or concerns raised, and should identify any asserted or established Aboriginal and treaty rights as conveyed to the Proponent.

2.4 Sustainable Development

Sustainable development, as defined in the Act, means development that meets the needs of the present, without compromising the ability of future generations to meet their own needs. Economic decisions need to be predicated on maintenance of ecological integrity, as healthy ecological systems provide for a healthy economy.

The EIS should consider these concerns and should incorporate the comments received during public and Aboriginal participation. The EIS should also, in considering the project, (including alternative means of carrying out the project), address the relationships and interactions among the various components of the ecosystems with the goal of meeting the needs of present as well as future populations.

2.5 Use of Confidential Information

The CEA Act encourages public access to documents produced within EA. To that purpose, the proponent must ensure not to include confidential information as defined in the applicable provincial and federal acts:

- Information that is sensitive or confidential (i.e., financial, commercial, scientific (e.g., locations of listed Species at Risk), technical, personal, cultural or other nature), that is

treated consistently as confidential, and the person affected has not consented to the disclosure, or

- Information that is likely to endanger the life, liberty or security of a person through its disclosure
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3 ENVIRONMENTAL ASSESSMENT FRAMEWORK

3.1 Agency Guidance

In preparing the EIS, the Proponent is encouraged to consult relevant Agency guidance and policy (http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=DACB19EE-1).

3.2 Methodological instructions

The environmental effects likely to arise from the Project (including situations not explicitly identified in these guidelines), the technically and economically feasible mitigation measures that will be applied, and the significance of any residual effects must be presented in the EIS.

It is possible that the EIS Guidelines may include matters that, in the judgement of the Proponent, are not relevant or important to the Project. If such matters are omitted from the EIS, they shall be clearly indicated with appropriate justification so that the Agency, technical and regulatory agencies, Aboriginal groups, the public and any other interested party have an opportunity to comment on this judgement. The Agency reserves the possibility to request additional information from the proponent, so that it is able to make an informed decision.

The Environmental Impact Statement must be presented clearly and concisely and focus on the aspects relevant to a proper understanding of the project and its impacts. Whenever possible, information should be presented in diagram or map form, at appropriate scales. The methods and criteria used must be presented and explained, indicating, whenever possible, their reliability, degree of precision and interpretation limitations.

The descriptions of the environment must include the information necessary to assess the quality of these descriptions (location of survey and sampling stations, survey dates, techniques used, limitations, etc.). The information sources must be provided in the references section.

The Proponent shall describe the methods and document how it used scientific, engineering, traditional and local knowledge to reach its conclusions. Selected assumptions shall be clearly identified and justified. All data, models and studies should be documented such that the analyses are transparent and reproducible. All data collection methods should be specified. The uncertainty, reliability and sensitivity of models used to reach conclusions should be indicated.

Insofar as possible, information must be presented in a synthesised manner in table form and the data, both quantitative and qualitative, included in the EIS must be analyzed in light of the relevant documentation. Any information that would facilitate understanding or interpretation of the data should be provided.

3.3 EIS Summary

The proponent shall produce a distinct report containing a summary of the information contained in the EIS. The proponent shall submit the report in French (20 copies) and English (10copies).

The summary shall include the following:

- A concise description of all key facets of the project
- A succinct description of the consultation conducted with Aboriginal groups, the public, and government agencies, with a summary of the issues raised and solutions found and/or suggested during these consultation
- A general overview of the key effects of the project and proposed technically and economically feasible mitigation measures
- The Proponent's conclusions and significance determinations from the assessment

4. CONSULTATION ACTIVITIES

In order to ensure meaningful public and Aboriginal participation, it is recommended that the material be prepared in a manner that facilitates consultation, including presentations (i.e. PowerPoint), maps, tables and other information materials, as well as a summary in the Aboriginals' spoken language, where applicable.

4.1 Public consultation

Public participation is a crucial component of the environmental assessment process. When the public has the opportunity to participate fully in the process, the quality and credibility of the environmental assessment are enhanced.

The CEAA requires three formal opportunities for public participation in order to collect public opinions, comments and concerns:

a) An initial consultation on the project and the conduct of the comprehensive study.

- Following the submission of comments by the public, the Agency may, if necessary, amend the environmental assessment guidelines to take the comments received into account.

b) A second consultation during the comprehensive study in order to comment on the results of the environmental assessment of the project.

- During this stage, the proponent will be required to contribute by preparing appropriate materials (executive summaries, visual aids, maps, tables, etc.) to facilitate consultation. If necessary, the proponent's presence might be required at certain consultation meetings

c) A third consultation on the comprehensive study after the Agency has submitted the

comprehensive study report to the Minister of the Environment.

The proponent is also encouraged to consult the public. The information required in this regard include the identification of the groups with which the proponent has met, the concerns they expressed, and the extent to which these concerns were incorporated into the project design and impact assessment.

4.2 Aboriginal consultation

When the Crown contemplates conduct that may have potential adverse impacts on established or potential Aboriginal and treaty rights, it has a legal duty to consult with Aboriginal groups before making a decision to proceed with the proposed conduct. In addition, pursuant to the CEAA, the federal environmental assessment must assess the project's potential environmental effects on the current use of lands and resources for traditional purposes by Aboriginal communities.

To that end, the EIS shall contain:

- A list of potential impacts on each of the communities that may be affected by the project;
- A description of the traditional land use and occupation that may be affected by the project;
- A detailed map overlaying the infrastructures and impacted zones on the areas of land and resources use (cf section 7.2). This large format map is a tool of work required to gather information from users of the territory;
- Expressed concerns and to what extent these concerns were integrated in the project design and in the EIS.

The description must include a summary of discussions, the issues or concerns raised, and should identify any asserted or established Aboriginal and treaty rights as conveyed to the Proponent. This information shall be used by the Crown to assess the potential impact of the project on asserted or established Aboriginal rights, Aboriginal and treaty rights, and the measures to prevent, mitigate, compensate or accommodate those potential effects.

4.3 Canadian Environmental Assessment Registry

In implementing the Act, the Government of Canada is committed to promoting public participation in the environmental assessment of projects and providing access to the information on which environmental assessments are based. In connection with this commitment, section 55 of the Act requires the responsible authority to maintain a public registry concerning every project for which an environmental assessment is carried out.

All documents prepared or submitted by the proponent or any other stakeholder in relation to the environmental assessment are included in the CEAR and made available to the public on request. Certain confidential or sensitive information that should be protected and not made public may be excluded from the CEAR. In such cases, the Agency, which is responsible for maintaining the CEAR, must be provided with arguments demonstrating a likely risk of harm.

Observations, comments and concerns expressed by the public following the consultation will be listed in the Canadian Environmental Assessment Registry (CEAR) and made available to the public on request. Personal information will be protected under the *Privacy Act*.

The CEAR website can be consulted at www.ceaa-acee.gc.ca/050/index_e.cfm

PARTIE 2 : PRÉPARATION DE L'EIE

5 SCOPE OF THE ASSESSMENT

Scoping establishes the boundaries of the EA and focuses the assessment on the relevant issues and concerns for the decision making. It determines the components of the proposed project that must be included in the EA as well as the main environmental components likely to be affected by implementation of the project.

5.1 Scope of the project

The scope of the project includes the activities and works that will be considered in the federal environmental assessment. For the purposes of the application of the Act, the scope of the project encompasses all of the project components, infrastructures, related works and accessories submitted by the proponent. All other works, permanent or temporary structures, or activities directly related to the project are also included in the project scope (e.g. temporary access roads, site clearing, cofferdams, earthworks, re-vegetation).

The scope of project includes all physical works and activities associated with the construction, operation and decommissioning (closure and post-closure) of the project as proposed by the Proponent.

5.2 Factors to be considered

The environmental assessment will include consideration of the following factors, listed in paragraphs 16(1) (*a*) to (*e*) and subsection 16(2) of the Act:

- The purpose of the project
- Alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means
- The environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects likely to result from the project in combination with other projects or activities that have been or will be carried out
- The significance of the effects referred to above
- The capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future
- Comments from the public that are received during the environmental assessment process

- Measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project
- The development of a follow-up program in respect of the project and its requirements

Subsection 2(1) of the Act defines an environmental effect as any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act* (SARA); any effect of any such change on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes by Aboriginals, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; or any change to the project that may be caused by the environment.

6 CONTENT OF THE EIS

6.1 Introduction and project background

Proponent

The study should:

- Provide the contact information (e.g. name, address, phone, fax, email) of the legal entity that will develop, manage and operate the project
- Identify key personnel, contractors or sub-contractors responsible for preparing the EIS

Regulatory Framework and the Role of Government

This section should identify, for each jurisdiction, the government bodies involved in the EA as well as the EA processes. More specifically, it must provide:

- Environmental and other specific regulatory approvals and legislation that are applicable to the project at the federal, provincial, regional and municipal levels
- Government policies, resource management, planning or study initiatives pertinent to the project and/or EA and discuss their implications
- Policies and guidelines of the Aboriginal groups being consulted that are pertinent to the project and/or EA and discuss their implications
- Any Aboriginal treaties that are pertinent to the project and/or EA
- Any relevant Land Use Plans, Land Zoning, or Community Plans
- Any pertinent land use plans or community plans

6.2 Project description

6.2.1 Need for and Purpose of the Project

The “purpose of” and “need for” the project must be established from the perspective of the proponent. The Proponent shall clearly describe the need for the Project by defining the opportunity motivating the Project and the pursued objectives. If the project objectives are related to or contribute to private- or public-sector policies, plans or programs, this information must also be included.

(Ref. Operational Policy Statement Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act*, November 2007).

6.2.2 Project components, activities and schedule

The proponent must provide a detailed description of the planned work and activities in the construction, operation, restoration, closure and decommissioning phases as well as for maintenance purposes. The proponent must also describe in detail the project components, infrastructure, and associated and ancillary works of the project. The description must include an implementation timetable for all the activities to be carried out in each phase of the project, as well as any other activities related to the project. If the project is part of a larger sequence of projects, the proponent must describe the broader context and, if necessary, present the relevant references. This includes detailed descriptions of the activities to be carried out in each phase, the location of each activity, the expected outcomes and an indication of the activity's magnitude and scale.

The project description must be sufficiently detailed to ensure the proper understanding of the issues and the determination whether these issues are likely to cause an effect. The geographic coordinates of the project site must be provided. The EIS must include, but is not limited to, a description of:

- The dikes, specifying their location, size and construction materials used
- The surface area of each of the various accumulation areas (waste rock, ore, overburden, tailings site)
- The permanent and temporary access infrastructure, specifying the route for each of the road and railway accesses as well as the location, type of structures used for the crossing (e.g. bridge, culvert) and the characteristics of the physical works at each river or stream crossing. For bridges, the characteristics include in particular the type, the clear span and the number of pillars, while for culverts, the characteristics include the type (arch or closed-bottom), the shape (round, square, arched, etc.), the material (steel, concrete, plastic, etc.), the dimensions (diameter, length, width and height), the slope, whether or not there are weirs
- The use of explosives, specifying whether they are used in an aquatic or terrestrial environment
- Any other components required by the project and relevant to the analysis of the project, such as: landing strip, wharf or berthing area for barges or boats, power line, etc.
- A map of the site: at an appropriate scale to show all the physical components of the project (pit, tailings site, overburden and waste rock dumps, dikes, polishing ponds, main road, secondary roads, power line, main buildings, etc.), distinguishing the existing components from the planned components. This map must indicate the dimensions and surface areas of the pit, tailings site, dumps, polishing ponds and treatment ponds as well as the location of the explosives magazine, the fuel depot and the water intake and outlet points

It is possible that some items of information may not be available at the time of drafting of the technical description; this information will have to be submitted to the Agency when available.

6.2.3 Water management

The EIS must assess and describe the project's surface water and groundwater supply requirements. The water intake and discharge infrastructure as well as the diversion ditches and canals must be located on a plan or map to scale.

The EIS must describe in particular:

- The source and volumes of water required, including for start-up of the processing plant
- All the other water intakes, indicating their location, dimensions, depth at which the water will be removed, quantity of monthly and annual removals, dimensions of the structures that will keep the water intakes in place and their area of encroachment below the natural high water mark;
- The volumes required for operations (mine, ore processing, fire control, drinking and sanitary water
- The effluent discharge points, alterations to the receiving environment at the effluent discharge point (encroachment, diking, etc.) and an estimate of the projected average monthly and annual effluent volumes
- The diversion ditches and canals

In addition, the EIS must estimate the volume of groundwater that will be pumped daily and indicate whether it will be necessary to lower the water table in the vicinity of the pit and, if applicable, describe the methods that will be used to achieve this.

6.2.4 Project setting

A description of the boundaries of the proposed project in a regional context showing existing and planned future land use, Aboriginal traditional territories/treaty lands/Indian Reserves, current infrastructure and proposed improvements to these infrastructure, including transportation (all modes), power distribution corridors and lines, and urban areas, shall be provided.

6.2.5 Project location

The EIS shall include a concise description of the geographic setting in which the Project is proposed to take place. The EIS must describe the regional setting of the project and present in map form at appropriate scales:

- A land use plan, including municipal boundaries, mining tenure, mining concessions and mining leases held by the proponent and other mining companies in the vicinity of the property, public land, private land and land-use designations
- A regional development plan presenting the future natural resource exploitation activities, plans regarding the establishment of protected areas, major land use issues, anticipated community, economic and recreation/tourism development; boundaries of designated ecological areas and environmentally sensitive areas such as national, provincial and regional parks, ecological reserves and other sensitive areas
- Current use of the surrounding lands, including traditional practices by Aboriginal peoples
- A description of the local and Aboriginal communities potentially affected by the project

6.2.6 Spatial / temporal boundaries and elements to examine

Spatial Boundaries

The proponent must define a study area whose spatial limits include all the project components and activities and their direct and indirect effects on the environmental components considered in the EIS. The study area is defined based on the area of influence, i.e. the area within which the direct and indirect environmental effects of the project components and activities will be felt.

Study boundaries shall be defined taking into account the spatial extent of potential environmental effects on the environmental components. These boundaries shall also indicate the range of appropriate scales at which particular baseline descriptions and the assessment of environmental effects are presented. The Environmental Impact Statement must include a summary table presenting the limits and their justification.

The Proponent is advised to consult with federal and provincial departments, Aboriginal groups, and the public, to confirm the spatial boundaries used in the EIS.

Temporal Boundaries

The temporal boundaries of the project should span all phases of the project: infrastructure preparation and construction, ore and access road exploitation, closure and The temporal boundaries of the project should span all phases of the project: construction, operation, foreseeable modifications, and where relevant, closure and decommissioning of the site, and restoration of the sites affected by the project in order to review short, mid and long term impacts.
Temporal boundaries shall also consider seasonal and annual variations related to environmental components. The EIS shall contain a justification and rationale for all temporal boundaries chosen for the project site

Valued Ecosystem Components

Based on the description of the environment, the environmental components that will be affected by one or more project activities must be identified. Of these components, special attention must be paid to the valued ecosystem components (VECs). The Proponent shall describe how the VECs were selected and what methods were used to predict and assess the adverse environmental effects of the project on these components. The value of a component may be assigned by its role in the ecosystem and its sensitivity, but also by the scientific, legislative or popular importance attached to it.

It should be pointed out that the limits for each VEC can differ. The proponent will clearly identify and justify the spatial delimitation chosen for each environmental component studied.

Proposals to modify this list of VECs in the EIS may be made, following consultations with Aboriginal groups, the public, federal and provincial government departments and relevant stakeholders.

7 PROJECT ALTERNATIVES AND ALTERNATIVE MEANS

To obtain further information, the proponent may consult the Agency's Operational Policy: Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act* (2007).

7.1 Project Alternative evaluation and Alternative means

The EIS shall identify and describe alternative means of carrying out the project that are technically and economically feasible (paragraph 16(2) (b) of the Act).

The EIS must include an analysis of alternatives to the Project describing functionally different ways to meet the Project's need and achieve the Project's purpose from the perspective of the Proponent. The proponent must identify the environmental effects of each alternative means and, select the best means based on a comparative analysis of the cost, environmental, economical and technical advantages considering the environmental impacts of each alternative means.
This analysis must be done to a level of detail which is sufficient to allow the Agency, technical and regulatory agencies, the public and Aboriginal groups to compare the proposed project with its alternatives.

7.2 Alternative means analysis [2]

The EIS must present an analysis of the alternatives to the project, including an analysis of the feasible alternative means for various project components.

In the selection of alternative means, supported by photographs illustrating each of the sites and their surrounding area, the analysis will have to take into account the physical and biological considerations of the environment, technical constraints and the significance of the effects associated with the alternatives chosen. The choice of feasible alternative means is based on the information collected, including data collected during surveys of the environment. The relevant geographic information will be presented in order to accurately locate the project components, the temporary infrastructures and the alternatives considered.

The preferred alternative means will be chosen using the comparative analysis of the environmental effects and their technical and economic feasibility.

When assessing project alternatives, the proponent shall examine the project components for which the requirements are provided in the following paragraphs.

Analysis of the alternative sites and concentrate transport alternatives

The proponent will describe the various sites considered for the location of the infrastructure components required to operate the mine, including in particular for the establishment of the ore processing plant, the preparation of waste rock and tailings accumulation areas, and the installation

[2] Also Referred to as « autres moyens de réaliser le projet ».

of the water treatment systems. The proponent will present the reasoning and the criteria used to determine the choice of sites, and specify how the criteria were considered. In the event that only one site is physically possible, the proponent will explain the reasoning for this.

The proponent will present the possible alternatives for ore concentrate transport and transhipment sites, as well as for the final destination of the ore concentrate.

Analysis of extraction method alternatives

The proponent will briefly present the advantages and disadvantages of the technologies considered for ore extraction and for protection of the environment, and will compare the technological choices with those selected elsewhere in Canada or abroad. The proponent will indicate how the mineralogy of the deposit influences the choice of technologies. The proponent will present the preferred technology and the environmental, technical and economic criteria justifying its choice. Liquid waste criteria, atmospheric emission standards and management of mine tailings will be considered in the analysis from an environmental protection standpoint.

Assessment of Alternatives for Mine Waste Disposal

The Proponent has identified the potential need to use natural water bodies frequented by fish for the disposal of mine waste, including tailings and waste rock, and for the management of process water. Before any fish frequented natural water bodies could be used for mine waste disposal, the *Metal Mining Effluent Regulations* (MMER) would need to be amended to add affected water bodies to Schedule 2 to designate them as Tailings Impoundment Areas (TIAs) before the water bodies can be used for mine waste disposal. This regulatory process would not be initiated until a detailed assessment of alternatives for mine waste disposal has been undertaken by the Proponent.

With respect to the assessment of alternative means of disposing of mine waste, the following guidance is intended to assist the Proponent in developing a robust assessment of alternatives. The Proponent is strongly encouraged to utilize the methodology provided by Environment Canada, outlined below, to conduct a robust and thorough assessment of alternatives for mine waste disposal. The Proponent will also continue to meet with involved parties to ensure that their concerns and input are addressed in the alternatives analysis.

Should an MMER Schedule 2 amendment be required for the project, it is strongly recommended that the Proponent undertake the assessment of alternatives for mine waste disposal as a component of the EIS. This would streamline the overall regulatory review process and minimize the time required to proceed with the MMER amendment process. This will also facilitate a thorough, transparent review of the assessment of alternatives as part of the EA process.

The assessment of alternatives for mine waste disposal should objectively consider all available options for mine waste disposal, including at least one that does not impact a natural water body frequented by fish. This assessment should qualitatively and quantitatively assess the environmental, technical and socio-economic aspects of each alternative. Both the short term impacts of each alternative and the long term risks through the closure and post-closure phases should be assessed. The assessment of alternatives for mine waste disposal needs to include all

aspects of the Project that may contribute to the predicted impacts associated with the proposed TIA. The economic component of the assessment for mine waste alternatives should consider the full costs of each alternative throughout the mine life cycle, from construction through post-closure, including long term maintenance and monitoring requirements, as well as costs associated with the legislated requirement for a compensation plan to offset fish habitat loss.

For further guidance, the Proponent should consult Environment Canada's *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (September 2011).

8. DESCRIPTION OF THE EXISTING ENVIRONMENT

The EIS shall provide a baseline description of the environment, including the components of the existing environment and environmental processes, their interrelations and interactions as well as the variability in these components, processes and interactions over time scales appropriate to this EIS.

In describing the physical and biological environment, the Proponent shall take an ecosystem approach that considers both scientific and traditional knowledge and perspectives regarding ecosystem health and integrity.

The proponent will describe the nature and degree of sensitivity of the project area and surrounding area and will indicate the particularly sensitive ecosystems and geographic areas as well as their relationships with the regional environment and the economy in general.

Insofar as possible, the Environmental Impact Statement will describe the sampling methods used for data collection in order to ensure that they are correctly understood and interpreted.
If the background data have been extrapolated or otherwise manipulated to depict environmental conditions, modeling methods shall be described. Should the proponent fail to provide information requested in the guidelines, reasons justifying this omission must be provided.

The proponent must ensure that the EIS considers, but without being limited to, the main components of the environment described in the following sections.

8.1 Physical components

8.1.1 Geology

The detailed characterization of the geological environment, including the mineral reserves and the materials comprising the overburden, is very important since they are the source of the large volume of waste associated with any mining project.

For the purpose of the EIS, the following elements shall be described, namely:

- a discussion of the soils, superficial and bedrock geology of the deposit which includes geological maps and cross-sections. Where appropriate, the following geologic parameters shall be included:

    - Representative lithologic descriptions including age, colour, grain size, mineralogy, physical strength, hardness, weathering characteristics, depositional setting and correlations
    - Spatial distribution and thickness of lithologic units, or links to vegetation and landforms;
    - Alteration styles, mineralogy, occurrence and intensity
    - Structural fabric (e.g. fractures, faults, foliation and lineations, etc.) and structural relationships
    - History of seismic activity in the area
    - Ore mineralogy, including sulphide types, abundance, mode of occurrence, extent of previous oxidation and an estimate of relative sulphide reactivity
    - Type and grade of metamorphism
    - Regional geologic framework including tectonic belt, terrain, regional metamorphism and structure
- Delineate the regional and local geological structures in the Project area that may affect the proposed infrastructure, and show their potential effect on the proposed infrastructure as well as links to acid rock drainage / metal leaching (ARD/ML) mitigation geochemistry. This includes major structural features as well as lesser local structures.

The EIS shall provide the following for geochemistry:

- A characterization of the geochemical behaviour of expected mine materials such as waste rock, ore, low grade ore, tailings, overburden and potential construction material, which should include:
    - Mineralogy
    - Elemental composition of major and trace elements
    - Potential for acid generation
    - Assessment of short term metal leaching properties
    - Longer term kinetic testing to evaluate rates of acid generation a (if any) and metal leaching
    - Longer term kinetic testing to evaluate the risks of contaminated neutral drainage and metal leaching

8.1.2 Soil quality

The EIS shall namely include:

- Baseline mapping and description of landforms and landform processes and soils within the project and study area, including the all-season road (ITS) and winter road corridors, to support the effects assessment for all terrestrial disciplines
- Map soil depth by horizon within the mine site area to support soil salvage and reclamation efforts
- Details of soil sample analysis at the Mine site completed and the quality assurance/quality control (QA/QC) program followed
- A summary of baseline data on the concentration of trace elements in the Mine site and FPF site soils prior to Project development

8.1.3 Hydrology

Surface water

The EIS shall describe surface water quality and hydrology at the project site and appropriate study areas. The description shall namely include:

- A description of hydrological data such as water levels and flow rates including monthly, seasonal fluctuations and year-to-year variability of all surface waters and a assessment of normal flow, flooding, and drought properties of lakes and streams
- A description of water quality sampling protocols and analytical methods, and provide maps and figures where appropriate
- A description of the interactions between surface water and groundwater flow systems
- A description of all surface water sources used for drinking water in the area
- Delineation of drainage basins

Hydrogeology and Groundwater

This section of the EIS shall describe hydrogeology at the project site and the appropriate study areas. The description shall characterize the physical and geochemical properties of hydrogeological units such as aquitards and aquifers, delineate regional and local groundwater flow patterns, identify recharge and discharge areas, and identify groundwater interaction with surface waters.

The EIS should also provide a description of baseline ground water quality at the project site and study area and include:

- An inventory and analysis of information on the groundwater resource in the area
- Any published reports, geologic maps, well record data and QA/QC procedures
- A description of any local and regional potable groundwater supplies, including their current use and potential for future use
- Maps showing groundwater divides and spring discharges, with Project facilities overlain
- A review of the physical geography and the geology of the area as it pertains to local and regional groundwater flow systems and aquifer/aquitard systems in the mine area
- Hydrogeologic maps and cross-sections for the mine area to outline the extent of aquifers, including fracture zones of bedrock, locations of wells, springs, potentiometric contours, and flow direction
- A summary of the collected physical and chemical groundwater quality data
- A description of water quality sampling protocols and analytical methods with maps and figures outlining sample locations

8.1.4 Atmospheric and acoustic environment

The EIS shall describe the Atmospheric and Acoustic Environment of the Project locations. Baseline data will be collected to describe the project site and the study area. Data used in the description shall be thoroughly discussed, including an analysis of how representative data is of condition at the Project locations. Its use would be qualified with an understanding of local and regional variability and the geographic locations meteorological stations.

Climate

The EIS shall also provide meteorological data including air temperature, relative humidity, precipitation, wind speed and direction, atmospheric pressure. The description of meteorological conditions shall consider seasonal variations within the study area. Special consideration shall be given in the analysis of extreme and rare meteorological phenomena.

The influence of regional topography or other features that could affect weather conditions in the study areas shall be described.

The following documents shall be used for guidance in establishing and operating any meteorological stations that may be established:

- Environment Canada AES, 2004. MSC Guidelines for Cooperative Climatological Autostations, Version 3.0 Meteorological Service of Canada, September 2004
- World Meteorological Organization, 2006. Guide to Meteorological Instruments and Methods of Observation. Preliminary seventh edition. WMO-No.8. Secretariat of the World Meteorological Organization, Geneva Switzerland

Air Quality

The proponent will submit a description of the ambient air quality determined on the project site and in the study area, in particular near sensitive receptors such as homes, schools, daycare centres, nursing homes, seniors' residences, recreational/sports centres, etc. The EIS will present the data concerning sources of pollutant emissions, their geographic scope and their variation over time.

The information will be presented in the format most appropriate for the reader's understanding, notably by means of tables and/or geographic maps.

Acoustic Environment

The EIS shall describe current ambient noise levels at the Project site and in the study area, in particular close to sensitive receptors such as residences, schools, daycare centers, centers for seniors, recreational and sports centers, etc. The EIS shall present information on its source(s), geographic extent as well as seasonal and temporal variations.

The information will be presented in the format most appropriate for the reader's understanding, notably by means of tables and/or geographic maps with sound level contour lines.

8.1.5 Aquatic environment

Benthic Invertebrates

The description of the existing aquatic environment shall include information on benthic invertebrate communities, including sediment quality (physical and chemical parameters), characterization of the community diversity and abundance. The baseline sediment data gathered shall be sufficient to support the development of biological monitoring programs and shall assess variation relative to historical data. The Proponent should give due consideration to sample benthic

invertebrate communities, including sediment quality in areas identified as potential final discharge locations.

Fish and fish habitat

The proponent must identify and characterize the fish habitats present in the water bodies and watercourses affected by the project. The baseline data gathered and presented as part of the EIS must:

- Provide the baseline data necessary to assess the project's effects on fish and fish habitat
- Contribute to the development of mitigation measures and compensation plans for project-related effects
- Provide the baseline data necessary for the continuous monitoring programs intended to assess the effectiveness of the mitigation measures and compensation plans

The proponent must ensure that the data and the information collected to characterize the environment are sufficient, in terms of quantity and quality, to provide an accurate representation of the environment affected by implementation of the project.

Physical characteristics of fish habitat

The EIS must illustrate, on a topographic scale map, the hydrographic network (water bodies and watercourses) including intermittent streams, flood risk areas and wetlands. The limits of the watershed as well as of the sub-watersheds of the study area must be identified.

The emphasis must be placed on the watercourses and water bodies likely to be affected by the project, their physical characteristics, physico-chemical quality and hydraulic regime. Hence, for all the watercourses and water bodies on which effects are anticipated, the EIS must describe the biophysical characteristics, including:

- For each watercourse, indicate the name of the watercourse and provide a description of the habitat by homogeneous section. The parameters which must be determined are length of the section, width of the channel from the high water mark, depth, current velocity, type of substrate, aquatic and riparian vegetation as well as natural or manmade obstacles, whether permanent, temporary or partial, to the free passage of fish. It is recommended that photos be attached to the description;
- For each lake or water body affected, indicate the name of the water body and provide a description. The parameters that must be determined are total area, bathymetry, maximum and mean depths, water level, type of substrate, surface area and location of the submerged and emergent aquatic vegetation, and water quality parameters (e.g. water temperature, turbidity, pH, dissolved oxygen profiles)
- Monthly/seasonal/annual volume data and outflow data
- Seasonal flows and annual hydrography (maximum and minimum flows)
- Natural obstacles or existing structures that hinder the free passage of fish

In marine and estuarine waters, also describe, where applicable:

- The tidal range as well as the low and high tides recorded on the project site

- The currents, the period of the year, as well as the climatic conditions which modify flow characteristics

Biological characteristics of fish habitat

In most cases, a fish sampling campaign must be carried out. The survey methods used must be described in order to allow DFO to ensure the quality of the information provided. If sectoral studies on fish and fish habitat were carried out previously, these studies must be submitted to DFO.

Hence, for all watercourses or water bodies on which the project is likely to have effects, the EIS must:

- Describe the fish species present on the basis of the surveys carried out and the data available (e.g. electric and experimental fishing, government and historical databases, sport fishing data, etc.). Identify the sources of the data and provide the information concerning the fishing carried out (e.g. location of the sampling stations, catch methods, date of catches, species)
- Specify the location and surface area of the potential or confirmed fish habitats and describe how they are used by fish (spawning, rearing, growth, feeding, migration, overwintering)
- Describe the habitat components and functions likely to be affected by implementation of the project
- Locate and describe the suitable habitats for species at risk on federal and provincial lists found or likely to be found in the study area

8.1.6 Vegetation

The EIS shall characterize the baseline vegetative communities within the area potentially affected by the Project. In particular, the EIS shall include information on the following key communities, species groups or ecosystems that have intrinsic ecological or social value:

- Forests
- Wetland ecosystems
- Riparian ecosystems
- Plant species and ecological communities of conservation concern

If the project involves activities that affect or interfere with the ecological or socio-economic functions of wetlands, the adverse environmental effects of the project on wetlands should be assessed. To do this, the proponent must:

- Adequately describe the wetland or wetlands present in the study area using a recognized methodology that encompasses soil characteristics, hydrology and vegetation
- Determiner the functions (e.g. hydrological, biogeochemical, ecological, socio-economic) of each wetland
- Determine the local, regional or even national importance of each wetland
- Assess the adverse environmental impacts by integrating a sequential process to prevent, minimize, or, as a last resort, compensate for degradation or loss of function in the wetlands

For additional information, the proponent can refer to the reference guides and documents on wetlands and on the:

- Federal Policy on wetland conservation Wildlife Canadian 1991, available at: http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=BBAAE735-EF0D-4F0B-87B7-768745600AE8
- Wetland Ecological Functions Assessment: An Overview of Approaches: http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=B8737F25-B456-40ED-97E8-DF73C70236A4

8.1.7 Wildlife Species (other than fish) and their habitat

Wildlife encompasses all living beings including all animals (vertebrates, birds and invertebrate organisms). For the wildlife species present within the study area, the EIS shall describe and identify the habitat components potentially affected by the project.

In most situations, sampling must be done. Inventory methods that are used must be detailed in order to ensure the quality of the submitted information. The following information must be submitted in the EIS, namely:

- A description of the species present (mammals and amphibians) and the functions of their habitat, based on the sampling and the available data, in terms of abundance, distribution and diversity, as well as habitat use of wildlife species of conservation concern, including detailed description of the methodology (survey description, timing, etc.) for each species of conservation concern identified
- All protected and conservation areas established by federal, provincial and municipal jurisdictions (e.g., wilderness areas, parks, sites of historical or ecological significance, nature reserves, federal migratory bird sanctuaries or National Wildlife Areas and wildlife management areas)
- A list of the observed bird species, particularly species for which breeding is confirmed in the study area
- Information on the relative abundance, distribution and density of migratory birds, including breeding, migration, staging and stopover as well as wintering; populations
- Results of the baseline surveys and desktop analysis to predict the anticipated effects on migratory birds

8.1.8 Species at Risk

The EIS shall describe and identify any biological species of conservation status at a federal, provincial, (i.e., COSEWIC and COSSARO-listed species, species listed under the *Species at Risk Act* and/or *Endangered Species Act* and their habitats) as well as species of conservation concern at a (i.e., regional or local level and their critical habitats, as outlined in the sections above.

The methods and results of wildlife surveys conducted during the seasons and during times of day which facilitate detection of the target species or species groups will be summarized in the EIS (with further detail provided in accompanying appendices). This includes information pertaining to species of conservation concerns that may occur at any point throughout the year in the Project area; including their conservation status relative abundance, distribution and habitat use.

8.2 Socioeconomic environment

8.2.1 Aboriginal land and resource use

The proponent shall describe the actual and proposed traditional land use potentially affected by the project, within the study area.
The EIS must provide a description of the land and resource use by the aboriginal communities within the study area. To this extent, the EIS shall include without being limited to, the following:

- A description of the locations and resources of social, economic, heritage, subsistence or cultural value for the aboriginal communities
- A description of the activities undertaken on the territory (camps, travel, hunting, fishing, trapping, harvesting, etc.)

8.2.2 Fishing, hunting and trapping

The EIS, for the study area, without being limited to, shall provide:

- Current land use and harvested species for recreational and commercial fishing
- Outfitters located near the mining site
- Use of the water bodies for fishing
- Number and location of trapping areas

8.2.3 Navigable waters

The EIS must identify all waterways and water bodies that will be directly and/or indirectly affected by components of the Project. First, the proponent is encouraged to apply the "Minor Works and Waters Order (*Navigable Waters Protection Act*)" to determine the minor works and waters that do not require an assessment under the NWPA. The following links provide the necessary information for this determination.

http://www.gazette.gc.ca/rp-pr/p1/2009/2009-05-09/pdf/g1-14319.pdf (beginning on page 1403)
http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-minorworks-menu-1743.htm

The proponent must then provide a list of the watercourse crossings that require approvals under the NWPA, indicating the main characteristics, dimensions and location of the watercourses as well as the crossing structures planned as part of the project. Photographs (taken upstream, downstream and from the side) representative of all the navigable waterways likely to be affected may also be provided.

Any known navigational use of the watercourse or water body shall be identified. The EIS shall provide information on current and/or historic usage of all waterways and water bodies that will be directly and/or indirectly affected by the Project development plan, including current Aboriginal uses, where available.

For additional information, see also the guide available on the Transport Canada Web site:
http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-menu-1978.htm

8.2.4 Cultural heritage and archeological sites

The EIS will identify and locate the terrestrial and aquatic areas, sites and infrastructure components of historical, archeological, paleontological, architectural or cultural value. A description of the value attached to these sites will be provided.

A cultural heritage resource is a human work or a place that gives evidence of human activity or has spiritual or cultural meaning, and that has historic value. Cultural heritage resources are distinguished from other resources by virtue of the historic value placed on them through their association with an aspect(s) of human history.

9 ENVIRONMENTAL EFFECTS ASSESSMENT

The purpose of this section is to present the assessment of the effects on the receiving environment of the planned work for the development, operation and subsequent phases of the mine. The impacts should be identified in accordance with the "Description of the receiving environment" section.

In order to facilitate identification of the interactions between the project activities and the components of the environment, a visual analysis tool may be presented in the EIS (matrix, networks of interactions, etc.). The assessment of the effects of each component and activity, in all phases, must be based on a comparison of the biophysical and human environments between the predicted future conditions with the project and the predicted future conditions without the project.

In undertaking the environmental effects assessment, the Proponent shall use best available information and methods. All conclusions shall be substantiated. The proponent must present the method selected for assessment of the effects as well as the associated uncertainty or bias. The methods used must be objective and reproducible and must be sufficiently clear and concrete so that the public can easily understand the reasoning followed in determining the effects.

The proponent must consider the short, mid and long-term effects of the project to cover the established scope comprised of the preparation, infrastructure construction, mine and road operations, mine restoration and decommissioning as well as restoration of sites associated with the project. These effects must be described using appropriate criteria defined in the EIS.

This documentation should include, for each potential project-related environmental effect, an indication of the nature of the effect, mechanism, magnitude, direction, duration, frequency and timing, geographic extent, and the degree to which it may be reversible.

In predicting and assessing the project's effects, the proponent must indicate important details and clearly state the elements and functions of the environment that may be affected, specifying the location, extent and duration of these effects and their overall impact.

The consideration of views from the public and Aboriginal groups, including any perceived changes attributed to the project, must be incorporated into the analysis.

Components to be considered

The proponent must take care to assess the project's effects on each component of the environment, including the selected VECs, as well as the interactions between these components and their relations within the environment. The following sections describe more specific information required for certain components of the environment.

9.1 Air quality

The documentation pertaining to the EIS must define the potential effects on air quality in all phases of the project, including the contribution to greenhouse gases. In particular, the proponent must provide the following information:

- An inventory of all project atmospheric emissions from point, area and mobile sources, such as exhaust gases from heavy and light vehicles, fugitive particulate emissions, emissions from diesel generators on the mining site, particulate matter resulting from the blasting, transport and storage of ore/waste rock/overburden, on the site, at the port of Sept-Îles and between the two
- An inventory of the human receptors and their distance from the project sources, identifying the sensitive receptors. The proponent must provide a description of all the types of human receptors, particularly the sensitive receptors: daycare centres, schools, hospitals, seniors' homes, etc.
- An inventory of all the potential contaminants emitted by the project, directly or indirectly, based on the sources identified and by period of operation
  (Particularly sulfur oxides [SOx], nitrogen oxides [NOx], particulate matter including total particulate matter [TPM], fine particulate matter [PM2.5] and respirable particulate matter [PM10], volatile organic compounds [VOCs], carbon monoxide [CO], ammonia [NH3], volatile organic compounds [VOCs], hydrosulfuric acid [HS], polycyclic aromatic hydrocarbons [PAHs], persistent organic pollutants [POPs], metals, as well as the atmospheric pollutants on the *Toxic Substances List, Schedule 1* of the *Canadian Environmental Protection Act*, 1999 [CEPA Environmental Registry]
- A characterization of the baseline (or background) concentrations of the potential contaminants, reflecting the conditions existing before commencement of the project. The data for each contaminant must be presented in a table comparing the baseline concentrations and those projected (modelled) near a few human receptors, as a function of the project-related activities
- A comparison between the projected concentrations and the benchmark air quality criteria as well as the guidelines for each contaminant listed in the inventory and following implementation of the proposed mitigation measures (where applicable). For example, the Canada-wide Standards,[3] the National Ambient Air Quality Objectives[4] and the air quality criteria of the Quebec Department of Sustainable Development, Environment and Parks (MDDEP)
- Modelling and mapping of the atmospheric dispersion of pollutant emissions taking the worst-case scenario into account. The proponent must provide a description of the model used and a discussion of the assumptions that may influence the results. In particular, the following elements must be shown on the map: the sources, the receptors, including the sensitive

[3] Canadian Council of Ministers of the Environment
[4] *Canadian Environmental Quality Guidelines*, 1999, Canadian Council of Ministers of the Environment

receptors, the isoconcentration curves for each contaminant, the direction of the prevailing winds, etc.

Depending on the information and the results of the analysis submitted by the proponent, a risk assessment to human health could be required.

9.2 Acoustic Environment

The EIS will assess the impact of the project by estimating the risk of noise pollution associated with all phases of the project. The assessment shall include, without being limited to, the following information:

- Identification of the sources (blasting, vehicle traffic, heavy equipment, transformers, etc.) and types of noise, night and day, during each phase of the project. For example, noise pollution in the audible frequency range may include sirens; impulsive noise can be caused by the blasting of quarries and detonation during mining activities and highly impulsive noise can be caused by hammering, pile-driving and pavement breakers.

- A map showing the location of sensitive human receptors in urban and rural environments, indicating the distance separating them from the project and specifying whether all the receptors have been identified on the map, for example, homes, daycare centres and schools, hospitals, places of worship and nursing homes. It should be noted that the regions affected are considered "quiet rural areas" if a day-night average sound level (Ldn) below 45 dBA (A-weighted decibel level) due to sounds from anthropogenic sources is measured.

- A comparative table of the baseline noise levels and the noise levels with the project in proximity to the sensitive receptors, day and night, and following implementation of the mitigation measures for each phase of the project. The data must be mapped by means of isometric curves. A description of the methods used to obtain the baseline levels and the predicted noise levels must be provided. The baseline noise levels refer to the local background noise present before the project. The noise levels with the project refer to the situation modelled and result from the addition of the effects of the project to the background noise. The sampling of the background noise must reflect the conditions existing before commencement of the project.

- The projected duration of the noise generated during the construction phase in order to assess the effects and propose mitigation measures. Health Canada uses Alberta Energy and Utilities Board Directive 38 [AEUB 20073][5] as a guide for deciding whether a construction noise must be perceived as a short-term noise relative to the absolute number of complaints. If the noise level generated by the construction has a duration of less than two months for any receptor, the noise is defined as temporary.

[5] Alberta Energy and Utilities Board. 2007. *Noise Control Directive 038 – Noise Control*, Revised Edition, AEUB, Alberta, Canada, February 2007. http://www.eub.ca/docs/documents/directives/Directive038.pdf.

- Estimation of the percentage of persons highly annoyed (% HA) as an indicator of the effects of noise on population health.
  - For noise resulting from the construction, operation or decommissioning phases with a duration exceeding one year, mitigation measures shall be proposed if the percentage of persons highly annoyed (HA) within the population increases by more than 6.5% compared to the situation before the project (baseline noise levels).
  - For noise resulting from the construction, operation or decommissioning phases the duration of which is less than one year, mitigation measures shall be proposed if the noise levels resulting from the project are expected to cause significant dissatisfaction within the population (e.g. increase in complaints) (Michaud et al. 20084).
  - Unusual situations can occur when the baseline noise levels are sufficiently high that the 6.5% criterion concerning the percentage of persons highly annoyed (% HA) is met even if the anticipated noise levels (with the project) [Tr sic: do not?] exceed the Ldn of 75 dBA. In such cases, mitigation measures should nevertheless be proposed.
  - If necessary, must be included noise control, monitoring and management plans, including a conflict resolution component, in the environmental management plan.

9.3 Hydrology and hydrogeology

Surface water

Based on the reference data, the EIS shall:

- Provide an assessment of changes to the hydrologic regime resulting from site construction (deforestation, removal of overburden, dewatering, increased drainage, etc.), operation, modification, decommissioning and post-closure, with a focus on lakes/ ponds and streams that relate to existing fish, fish habitat and proposed fish compensation plans
- Include details about changes in the magnitude of stream flow, timing and duration for normal, dry and wet hydrologic conditions
- Include details about changes in overall water chemistry to impacted waterbodies from all sources of effluent, surface drainage, and seepage document run-off and sediment control works
- Describe document run-off and sediment control works
- Determine surface water supply requirements
- Include maps that show future basins delineation, drainage direction, proposed diversions channels and surface drainage collection management features
- Include consideration of the effects of climate change and variability on the future flow regime and water balance assessment, hydrology, such as peak flow rates and the location of ice jams that could affect the environment or Project infrastructure

With respect to the water balance for the Project

- A detailed water balance during operation, closure and post-closure phases of the Project, for a range of hydrological conditions:
  - The water balance model shall evaluate the average precipitation scenario as well as a full range of possible wet and dry scenarios. The possible effects of each different precipitation sequence on mine water management activities shall be tracked, and the results presented in terms of probabilities of occurrence.

- The predicted water balance for each year of the mine life and all inflows and outflows shall be provided in tabular format. Appropriate return periods shall be defined and methodologies for the evaluation of wet, dry and expected scenarios shall be discussed.

With respect to water management, the EIS shall:

- Predict the surface run-off coefficient and rate of run-off, and describe contingency plans for extreme run-off events and drought conditions
- Provide detailed assessment and prediction for all site water diversions
- Recommend measures for dealing with water inflows to the open pits during operation
- Profile the open pits and show levels to which flooding can be achieved after closure based on hydrology and the pit design and contours and provide predictions with respect to flooding rates and ultimate water levels for the open pits after closure
- Provide the conceptual design features of all collector and diversion ditches, culverts, bridges, and water storage facilities (including sediment ponds, seepage collection structures, e.g., ponds, interception wells, etc.)
- Cross-sections of the ditches and water storage facilities shall be provided and include the run-off flow return period to which the works can convey all flows, and to which the works can withstand flows without significant damage
- Include an assessment and prediction for all site water diversions including volumes, discharge structures and locations, and potential effects on the receiving environment hydrology
- Identify, map and characterize any faults located in the open pits and the extent of the faults beyond the confines of the open pits. Include an assessment of the hydraulic connection between the open pits and the adjacent water courses.

Groundwater

The EIS shall:

- Provide a qualitative and quantitative groundwater assessment to determine how the Project and related facilities and activities will impact: the local hydrogeological and groundwater units, groundwater flows, quality and quantity during: site preparation, construction, open pit development, tailing impoundment areas (TIA) and process water pond development, operations, decommissioning (closure), and post closure care. The assessment shall describe the duration, frequency, magnitude and spatial extent of any effects and residual effects, outline the need for mitigation and/or monitoring measures, and assist with ARD/ML prediction work;
- Provide results of the hydrogeological assessment that determines: groundwater seepage location, rates, seepage quality, and direction into or from: the open pits, mine rock stockpiles and other stockpiles, TIA facilities, primary sedimentation pond and process water pond; and from the pits during future overflow;
- Provide detailed drawings and/or figures showing groundwater contours (piezometric surfaces) to determine/illustrate projected seepage conditions for the applicable project features (e.g. open pits, mine rock stockpiles, TIA, dams, primary sedimentation pond, process water pond);

- Provide an assessment of the effects/impacts of groundwater seepage within the project area on surface stream flows, surface water quality, fish and fish habitat;
- Provide a discussion of the potential for off-site migration of impacted groundwater, and an analysis of contaminant attenuation capacities within the hydrogeological units within the project area;
- Provide a description of any proposed mitigation, flow measurement, and monitoring strategies for groundwater seepage within the mine operations area (as defined by the MMER);
- Include a determination of the expected location and rates of seepage from the TIAs and mine rock stockpiles, characterize the seepage quality, and define any proposed mitigation strategies. Potential seepage to other waterbodies shall be emphasized and assessed for potential impacts to fish and fish habitat. Detailed drawings and/or figures showing equipotential contours to determine/illustrate projected seepage conditions for the dams, ore storage, and mine rock stockpiles, as applicable, shall be provided;
- Provide the results of a groundwater flow model of the local catchment for the post closure period incorporating all major permanent mine components, including the open pits, TIAs, and mine rock stockpiles;
- Include the lithology for all wells from which data was collected to be used in the EIS;
- Make available all relevant base map files and calibration data sets that have been used in the hydrogeological assessment;
- Include recommendations regarding appropriate monitoring well locations to detect seepage from the various Project facilities, appropriate requirements for well purging prior to sampling, and appropriate frequency of sampling of monitoring wells;
- Include an analysis of the potential for sulphide oxidation within surficial and bedrock units as a result of groundwater drawdown within the project area;
- Demonstrate how, and if the withdrawal of groundwater during project development (i.e. construction, operations, modifications, decommissioning and post-closure), or the creation of physical changes to the aquifers within the project area, shall affect the availability of groundwater for applicable users (e.g. mine site facility operations, on-site drinking water systems) or baseflows in surface water (surface watercourses), thereby causing surface water impacts;
- Include a Water Management Plan for all dams, including flows and levels during construction, operation, closure and post-closure. The assessment shall include diversions and impacts to aquatic systems from increased and decreased surface flows; and
- Include effects of surface infiltration on groundwater flows that may affect discharges into streams and lakes.

9.4 Water Quality and Aquatic Ecology

In conducting the effects assessment for water quality and aquatic ecology, the EIS shall include the following:

- Details about changes in overall water chemistry to impacted water bodies from all sources of effluent, surface drainage, and seepage from the mine operations area (as defined by the MMER)

- Graphical presentation of key variables and stream flows over time for key sites to illustrate patterns and variability
- The entire range of data in addition to mean values, because extreme events that have serious environmental consequences can be lost when using only mean values
- All of the data in an appendix, including summaries of the maximum, minimum, mean or median, standard deviation and coefficient of variation for each site

The EIS shall integrate results of the ARD/ML prediction work and surface hydrology and water balance information to develop water quality predictions for input into the impact assessment work. The EIS shall include the following:

- Information describing how current baseline and ongoing surface and groundwater quality and flow rates are anticipated to be altered by individual mine components. Information shall focus particularly on the open pits, ore stock piles, waste rock piles, TIA/waste rock impoundments, and roads
- An assessment and prediction of water quality for major mine components (waste rock stockpiles, open pits, low grade ore stockpiles, etc.) and all site water discharges, including groundwater discharge points in lakes and streams, for the different phases of the Project (i.e. construction, operation, modification, decommissioning, post-closure). This assessment shall include volumes, water quality, discharge structures and location, potential effects on the receiving environment from all cumulative site water discharges and the description of any mitigation strategies and/or treatment processes
- A description of contingency plans if there are significant uncertainties or risks associated with the predicted water quality, and for dealing with excessive run-off events and drought conditions if necessary
- Strategies for management, flow measurement, and water quality monitoring of surface drainage from the mine operations area (as defined by the MMER), including mitigation strategies to separate contact water from non-contact water and how to prevent erosion and sediment discharge during the construction, operational and closure and post-closure phases
- Details on additional water requirements (if applicable) necessary to maintain full saturation of the PAG material. If exposure is expected, the results of kinetic test work shall be provided to assist in the determination of an acceptable exposure period

The ARD/ML prediction information shall be used to predict water quality for effects assessment and to determine mitigation requirements for the Project. Additional information shall be provided on the following:

- the type and method used for the ARD/ML prediction and possible mitigation measures;
- waste rock, tailings and low grade ore characterization, volumes, segregation/disposal method mitigation/management plans, contingency plans, operational and post-closure monitoring and maintenance plans;
- assessment of the feasibility to successfully segregate potentially-acid generating (PAG) and non-potentially acid generating (NPAG) waste materials during operations, proposed geochemical segregation criteria and identification of operational methods that will be required to achieve geochemical characterization during operations (i.e. geochemical surrogates, on site lab, procedures needed, etc);
- sensitivity analysis to assess the effects of imperfect segregation of waste rock;

- estimates of potential lag time to ARD/ML onset for PAG materials (including various waste rock, tailings, low grade ore) and ability to fully saturate PAG materials during operation and post-closure;
- pit water chemistry during operation and post-closure, and pit closure management measures (e.g. flooding). This shall include geochemical modeling of pit water quality in the post-closure period;
- ARD/ML prevention/management strategies under a temporary or early closure scenario, including low grade ore.
- surface drainage and seepage water quality and quantity from the waste rock dumps, tailings/waste rock impoundment facility, stockpiles, roads, and other infrastructure within the mine operations area (as defined by the MMER) during construction operation and post-closure; and
- effluent, surface drainage and seepage characterization and quality predictions. Predicted effluent quality should be directly compared to toxicity data, where available;
- waste discharge, surface drainage and seepage flows, concentrations, and loadings shall be predicted using data from various sources, which include:
    - quantity and quality of groundwater and surface drainage from the mine operations area
    - if any lakes are to be drained, quantity and quality of water to be released from those lakes into the receiving water,
    - quantity and quality of tailings pore water from milling process tests,
    - quantity and quality of leachate from samples of tailings, waste rock, and ore,
    - quantity and quality of effluent, surface drainage and seepage to be released from the mine operations area as defined by MMER into all receiving waters, and
    - quantity and quality of humidity cell or column test liquid from acid rock testing;
- use of the predicted waste loads in a mass balance model of the mine area to predict the resulting receiving water quality under normal (construction, operation, modification, closure, post-closure) and storm conditions (e.g., 1-in-10 year flood and low flows);
    - the EIS shall include predictions of waste loads and water quality on a month by month basis for the critical years of mine site development (critical years are those years when worst-case contaminant loads are expected such as during construction, years when significant construction events or water use change occur, milestone years of operation, and at closure);
- assessment of the spatial extent of effects downstream of the Project (e.g., effluent dilution modeling) down to a magnitude that is indistinguishable from natural variability (e.g. baseline plus or minus 2 standard deviations, if outside 95% of measured results or some other, well-rationalized criterion); and
- assessment of the environmental effect of the predicted waste loads and receiving water quality under worst case conditions, and assess the environmental effect of the resulting water quality on aquatic organisms using federal and/or provincial water quality objectives.

9.5 Benthic Fauna

In assessing the effects of the Project on sediment quality, the EIS shall:

- Discuss how potential changes related to all phases of the project may affect toxicity and physical habitat requirements (e.g., particle size) for benthos
- Identify sediment parameters that may be present at elevated levels, in comparison to applicable federal and provincial sediment quality guidelines, and, if necessary, use this information to propose site-specific sediment quality objectives

9.6 Fish and fish habitat

The impacts should be identified in accordance with the "Description of fish habitat" section. In predicting and assessing the consequences of the project, the proponent must provide the important details and clearly indicate which components of the aquatic environment may be affected, what the effects on fish and fish habitat will be the magnitude, duration and overall impact of these effects.

Losses of fish habitat must be described in terms of the surface areas affected for the various fish habitat functions impacted by the project (spawning, rearing, growth, feeding, migration).

A hydrogeological study may be required in order to determine, if applicable, the effects of pit dewatering and water table drawdown on surface water and, consequently, on fish habitat.

Measures to mitigate the effects on fish habitat

When it is determined that a work or an activity will have adverse effects on fish habitat, the proponent must, after having considered and documented the possibility of relocating or modifying the project, plan mitigation measures in an effort to reduce the project's effects on fish habitat. Examples of such measures include bank stabilization using vegetation to minimize erosion or the installation of protection structures to prevent fish entrainment and mortality.

The reasoning followed to determine whether the proposed measure reduces the significance of the effect on fish habitat must be explained. The mitigation measures apply only to the chosen alternative.

The proponent can use the pathways of effects (available on DFO's Web site at http://www.dfo-mpo.gc.ca/habitat/what-quoi/pathways-sequences/index-eng.asp) to identify the potential effects and the mitigation measures that can be applied to reduce or eliminate effects on fish habitat.

Effects on fish and fish habitat after application of the mitigation measures

The proponent must demonstrate that every effort has been made to minimize the project's effects on fish and fish habitat. The effects of the project that remain, despite the application of mitigation measures, should be assessed based on the various works or activities.
In assessing the project's effects on fish habitat, the following aspects must be specifically considered:

- The consequences of the loss or alteration of watercourses and water bodies during the construction and operation phases (diversion, draining, reduction in surface water supply)
- The surface areas encroached, drained, flooded or altered temporarily or permanently by implementation of the project, including wetlands, with a description of these environments in connection with the various types of fish habitat affected (potential or confirmed)
- Changes in hydrologic conditions and, if applicable, hydrodynamic conditions on fish habitat functions (spawning, rearing, growth, feeding, migration)
- The need to maintain fish passage will have to be documented and, when required, a description must be provided of the structures that will help maintain fish movement both upstream and downstream.

Compensation of residual effects on fish habitat

Context

In accordance with the principle of no net loss, set out in DFO's Policy for the Management of Fish Habitat, unavoidable and authorized harmful alteration, disruption or destruction (HADD) of fish habitat must be compensated.

In order for a project to be used as a compensation project, it must first be approved by DFO and lead to either the creation of fish habitat, the restoration of degraded fish habitat or the improvement of natural habitat for a given species or function.

Although DFO can advise proponents throughout the process, it is the responsibility of the proponent to find, propose, carry out and monitor the effectiveness of a compensation project to offset the residual HADD of fish habitat for which the proponent is responsible. Once a satisfactory compensation has been identified, it constitutes a condition of authorization issued under subsection 35(2) of the *Fisheries Act*.

In some instances, DFO may require a letter of credit from a bank covering the costs of the compensation and follow-up monitoring measures. In this case, the proponent will have to provide DFO with a breakdown of these costs.

Information required

As a guide, a compensation project proposal must include the following:

- A description of the problem to be corrected affecting fish habitat (e.g. degraded habitats, recruitment problem, habitats underrepresented in a system, suboptimal habitats, an obstacle to fish movement). The description should be accompanied by well-documented photos (location, date, etc.) of the site indicating the date on which these photos were taken. The proponent must ensure that the data and information collected to characterize the environment are sufficient, in terms of quantity and quality, to provide an accurate representation of the environment as it currently exists
- Identification of the fish habitat functions that will be developed and the species targeted by the development projects

- A description of the habitat compensation development projects considered in order to improve on the current situation (e.g. structure dismantling, addition of a spawning ground, installation of riffles, cleaning, reprofiling and vegetation of a site, improvement in flow conditions)
- The size of the development projects (surface area, distance, etc.)
- The exact location (name of the watercourse, latitude and longitude) of each site to be developed and their ownership status

The type and amount of information to be provided can vary depending on the type of environment or development concerned. Proponents are therefore encouraged to consult DFO to determine the information requirements for each case. The purpose of this approach is to avoid investing too much time and effort in documenting an option that may not be approved.

Analysis by DFO

On receiving a compensation project proposal, DFO will determine whether the compensation project will actually produce gains (relevance analysis) and whether these gains are likely to be lasting (design analysis) and sufficient weighed against the HADD of fish habitat to be compensated (sufficiency analysis). Should DFO determine that the proposal is indeed relevant, that it is well-designed and that the associated gains will likely be sufficient, the compensation project will constitute a condition of the authorization that will be issued under the FA. This compensation plan will likely also be subject to review by Aboriginal groups, the public and regulatory agencies before being finalized and implemented.

Analysis of the relevance of the compensation project

The purpose of the relevance analysis by DFO is to validate whether the proposed compensation project is likely to actually produce improvements over the current situation. The relevance analysis will depend on the quality of the description of the problem to be corrected or the improvement made by the compensation project. It is at this stage that DFO will assess its degree of comfort with the choice of species and habitat function targeted by the compensation project and its location relative to the HADD of fish habitat.

Analysis of the design of the compensation project

The objectives of the analysis of the design of the proposed compensation project are to validate whether the characteristics of the development meet the needs of the target species and whether there is a good probability that the development will be lasting. This analysis also aims to verify whether the components of the development are realistic and have no unacceptable collateral effects (e.g. access road that is too large).

Analysis of habitat gains

The purpose of this step is to validate that the compensation project chosen provides gains that are sufficient when weighed against the HADD of fish habitat caused by the project. Like the relevance analysis, there are no precise rules for determining whether a compensation project provides

sufficient gains. This assessment of the gains is based on professional experience and the available information concerning both anticipated habitat losses and the environment in which the development will be carried out. The aspects considered in the analysis include:

- The species affected by the loss and the compensation development project
- The function(s) of the habitat lost and developed (feeding, spawning, migration, etc.)
- The rarity of the habitat lost and developed
- The area of habitat lost and the area of habitat developed
- The quality of the habitat lost
- The magnitude of the anticipated effect (harmful alteration, disruption or destruction)
- The expected gains associated with the compensation relative to the current habitat
- The delay between the time a loss is caused and the time when the compensation development project will produce the expected gains

Approach to the search for a compensation project

Considering the difficulties involved in devising compensation projects, evaluating their relevance, ensuring that they are well-designed and properly implemented and followed up, the compensation approach should favour the implementation of large projects that have a good chance of success rather than the implementation of several small and geographically scattered development projects. Priority should be given to compensation proposals that will be carried out in the watershed of the river affected or in neighbouring water bodies or rivers. However, compensation developments in areas further away could be considered where justified. This might be justified if it is not feasible to carry out relevant developments locally, a compensation opportunity exists which is likely to produce greater gains or with a greater likelihood of success elsewhere, a more favourable cost-benefit ratio for fish habitat, a regional interest or technical considerations.

DFO is willing to consider compensation developments aimed at the habitats of species other than those affected by the HADD of fish habitat, provided that these other species are valued by users in the area and valid supporting arguments are presented.

DFO is also willing to consider development strategies aimed at restoring fish passage or opening up territory for valued species. It should be noted that it will be necessary to involve without delay the various relevant provincial, federal or Aboriginal stakeholders.

A follow-up program, developed by DFO and approved by the proponent, will verify the compliance and the effectiveness of the proposed compensation measures. If the results of the follow-up indicate that the compensation is not working as planned, DFO can require the proponent to make adjustments or to implement additional compensation measures, if necessary.

9.7 Vegetation

The Proponent shall develop appropriate mapping products to assist in assessing the effects of the Project on key vegetative communities, and identifying rare ecosystems and species at risk. The proponent shall assess the potential effects of the Project on vegetation, including species known to be important to Aboriginal people and groups. The EIS shall present the works to be undertaken in

the aquatic and riparian ecosystems, including those in intermittent watercourses, flooding zones and wetlands (peatbog, marches and swamps).

9.8 Wildlife

The proponent will examine the aspects relating to wildlife in the areas potentially affected by all phases and all components of the project. The EIS shall include:

- The identificationand assessment of the potential effects of the Project on terrestrial wildlife and amphibians that may be affected by the Project with particular attention to riparian, wetland, cliff and forest ecotone habitats, where applicable
- Amount of wildlife habitat potentially lost per type of habitat. The EIS will include wildlife habitat suitability interpretations for wildlife species and species of conservation concern that are known or likely to occur in the Project area
- Identification of mitigation measures to minimize or eliminate any adverse effects on wildlife, including wildlife habitat, particularly in the vicinity of wetland, lake and riparian habitats and on migratory corridors

Species At Risk

The EIS shall address issues related to species of conservation concern and their habitat, for the areas potentially affected by the Project.

9.9 Socioéconomic environment[6]

Aboriginal rights and interests

The EIS will provide information on the effects of the project on aboriginal groups' interests and on asserted or established Aboriginal and treaty rights. Based on the information provided by the aboriginal groups or other sources, the proponent shall determine:

- Any potential environmental effects on current uses of land and resources by Aboriginal communities for traditional purposes
- Any environmental effects which have effects on lifestyle, culture and quality of life of Aboriginal groups
- Measures to avoid, mitigate, compensate or accommodate environmental effects which may limit the current use of lands and resources for traditional purposes
- Any environmental effects of the Project which result in effects on heritage and archaeological resources in the Project area that are of importance or concern to Aboriginal groups
- The residual impacts of any effects identified above on asserted or established Aboriginal and treaty rights

[6] *The definition of the term "environmental effect" in the Act includes economic and social changes that are caused by biophysical modifications of the environment. In other words, the Act does not provide for the assessment of the direct economic and social effects of the project.*
However, in certain contexts, the federal Crown may take such direct effects into account in determining whether potential significant adverse environmental impacts are justifiable.

Hunting, fishing and trapping

The proponent must evaluate the effects of the project implementation on commercial and recreational fishing, as well as on traditional or subsistence fishing by Aboriginal communities, in lakes and lotic environments affected and will present mitigation or compensation plans.

With regards to hunting and trapping including traditional activities by Aboriginal communities, the EIS shall :

- Identify the number of commercial recreation tenures and activities affected by the Project and describe the effect in relation to the affected trapping zones
- Propose mitigation measures for diminished wildlife and wilderness values the registered traplines affected, where appropriate

Navigable Waters

In order to complete an assessment of the potential effects of the Project on navigable waters, the EIS shall:

- Identify any Project components that will affect waterways and water bodies, including a description of any activities (e.g., dredging, alteration of water bed and/or water banks) that may affect waterways and water bodies
- Identify if there are existing works that were not previously authorized under the *Navigable Waters Protection Act* to be modified on a watercourse or water body
- Describe any ancillary and temporary works (e.g., cofferdams, detours, fencing, or temporary bridges) including approximate dimensions
- Describe the anticipated direct and/or indirect effects on the waterways and water bodies, including, but not limited to, changes in water level and flow
- Describe how the use of waterways may be affected either directly or indirectly by the Project development plan, including current Aboriginal uses
- Propose mitigation measures to avoid affecting navigation, if applicable

9.10 Effects of the Environment on the Project

The definition of an 'environmental effect' under the Act includes any change to the project that may be caused by the environment. Therefore the EIS shall take into account how local conditions and natural hazards, such as severe and/or extreme weather conditions and external events (e.g. flooding, landslides, fire, drought, seismic events) could adversely affect the project. The proponent shall present in what manner these effects were taken into account in the project design.

Longer-term effects of climate change shall also be discussed up to and during the projected post-closure phase of the project. This discussion should include a description of climate data used.

The Canadian Environmental Assessment Agency Procedural Guide, *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners* (2003), provides guidance for incorporating climate change considerations in an EA.

9.11 Malfunctions and accidents

The probability of possible malfunctions or accidents during construction, operation, modification or any other undertaking in relation to the project, and the potential significant adverse environmental effects of such events, will be identified and described in the environmental assessment. The description will include, but not be limited to, the following:

- Accidental spills of hazardous materials, chemicals, petroleum substances or tailings
- Risk of fire and explosion at the site
- Wildfires
- Contingency plans and measures for responding to emergencies that may involve risks to environmental components

9.12 Sustainability of the resource

The environmental assessment will consider the renewable resources that may be significantly affected by the project. The proponent will describe theses resources, will describe how the project can influence their sustainable use and, procide the criteria used to determine whether their sustainable use will be compromised.

9.13 Mitigation measures

As a first step, the Proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include the modification of the design of the project or relocation of project components.

The Act defines “mitigation” as the elimination, reduction or control of the adverse environmental effects of a project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. Every comprehensive study conducted under the Act must take into account measures that would mitigate any significant adverse environmental effects of the project.
The analysis must propose for all the identified environmental effects of the project, the implementation of feasible mitigation measures and present an assessment of the effectiveness of the proposed mitigation measures.

Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective shall be clearly and concisely described.

Determination of the Significance of Residual Effects

The EIS should present and describe any residual effects of the project on biophysical and human environment after mitigation measures have been taken into account.

The EIS must include a summary of residual effects of the project so that the reader clearly understand the real consequences of the project and the extent to which the effects can be mitigated or compensated.

The EIS must identify the criteria used to assign significance ratings to any predicted adverse effects as well a detailed analysis of the significance of the potential residual adverse environmental effects. It must contain clear and sufficient information to enable the Agency, technical and regulatory agencies, Aboriginal groups and the public to understand and review the proponent's judgment of the significance of effects. The following elements should be used in determining the significance of residual effects:

- Magnitude
- Geographic extent
- Timing, duration and frequency
- Reversibility

9.14 Cumulative environmental effects

The Proponent shall identify and assess the cumulative environmental effects of the Project, in combination with other past, present or reasonably foreseeable projects and/or activities within the study areas. Cumulative effects may result if the implementation of the project being studied caused direct residual negative effects on the environmental components, taking into account the application of technically and economically feasible mitigation measures. It may also result if the same environmental components are affected by other past, present or reasonably foreseeable future actions (projects or activities).

A cumulative effect on an environmental component may, however, be important even if the assessment of the project's effects on this component reveals that the effects of the project are minor.

The proponent will present a justification for the geographic and temporal boundaries of the cumulative effects assessment. It should be noted that these boundaries may vary depending on the components selected for cumulative effects assessment. The proponent will propose and justify the choice of projects and selected activities for the cumulative effects assessment; these shall include past activities and projects, those currently being carried out, and those with a high likelihood of being carried out.

The EIS shall identify measures that will mitigate any significant adverse cumulative environmental effects. The Proponent shall assess the effectiveness of the mitigation measures. In cases where measures exist that are beyond the scope of the Proponent's responsibility that could be effectively applied to mitigate the effects, the Proponent shall identify these effects and the parties that have the authority to act. In such cases, the Proponent shall summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term.

The approach and methods used to identify and assess cumulative effects shall be explained. The Canadian Environmental Assessment Agency's Operational Policy Statement OPSEPO/ 2- 2007, *Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act*, and the *Cumulative Effects Assessment Practitioner's Guide* (CEAA 1999) provide further guidance for conducting cumulative effects assessment.

10. SOCIOECONOMIC BENEFITS OF THE PROJECT

Information on the predicted economic and social benefits of the project should be presented. This information will be considered by the Agency and technical and regulatory agencies in assessing the justifiability of any significant adverse environmental effects, if necessary.

Benefits of the environmental assessment process

The proponent is invited to describe how the EA process for the proposed project provided a benefit to Canadians. Factors to be considered include:

- Maximized environmental benefits: what were the environmental benefits created as a result of the project going through the EA process?
- Contribution of the EA to support sustainable development: describe how the EA process for the project contributed to the concept of sustainable development for a healthy environment and economy.
- Public Participation: how did the public participation in the EA influence the project design and the environmental effects analysis?
- Technological innovations: were there any new technologies developed to address environmental impacts that could be used for other projects?
- Increases in scientific knowledge: describe any new scientific information collected through the EA that could benefit the assessment of other projects.
- Community and social benefits: describe any changes in project design that resulted in indirect benefits to communities and/or social benefits.

11. ENVIRONMENTAL MANAGEMENT AND FOLLOW-UP PROGRAM

The purpose of the environmental management plans (EMPs) is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of project, and to provide action plans and emergency response procedures to account for human and environmental health and safety. The EMPs will serve to provide guidance on specific actions and activities that will be implemented to decrease the potential for environmental degradation during construction and operation, and to define the proponent's ongoing environmental commitment.

The EIS shall describe the proposed EMPs for all stages of the project and include a commitment by the Proponent to implement the EMPs should the project proceed. The finalization of detailed EMPs will occur through consultation with federal and provincial government agencies, Aboriginal groups, the public and other stakeholders. The Proponent shall provide the monitoring activities results by reporting to the Agency or the concerned federal department according to convened methods, including reporting frequency, methods and format. Pertinent legislation, regulations, industry standards, documents and legislative guides shall be used in the development of the EMPs.

The EIS shall provide the preliminary outline of a decommissioning and reclamation plan for any components associated with the project. The plan would serve to provide guidance on specific actions and activities to be implemented to decrease the potential for environmental degradation in the long-term during decommissioning and abandonment of facilities.

Pursuant to paragraph 38(2) of CEAAct, comprehensive studies must include a follow-up program. A follow-up program is designed to verify the accuracy of the EA and to determine the effectiveness of the measures implemented to mitigate the adverse environmental effects of the project. The EIS must describe the proposed follow-up program plan in sufficient detail to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them), and to confirm both the EIS assumptions and the effectiveness of mitigation measures.

The follow-up program must include a schedule indicating the frequency and duration of effects monitoring. The description of the follow-up program shall include any contingency procedures/plans or other adaptive management provisions as a means of addressing unforeseen effects or for correcting exceedances as required to comply or to conform to benchmarks, regulatory standards or guidelines.

12 CONCLUSION

This section of the report shall summarize the overall findings with emphasis on the main environmental issues identified. It shall include, in a table, the summary of all key commitments in implementing mitigations, contingency plans, monitoring, taking corrective actions, reclaiming the site and providing offsets for unavoidable project effects as well as the calendar for the implementation of these measures.

13. IMPACT STUDY REPORT PROCEDURES

The proponent is encouraged to produce a single impact assessment that meets the requirements established by the MDDEP and the federal authorities. In addition to the summary, (for which the applicable requirements are presented in section 3.3 of the present document) that must be submitted in French and English, the proponent must provide the Agency with twenty-five (25) French hard copies of the impact assessment, as well as electronic versions. Any additional document produced following questions and comments from the Agency must respect the same requirements. It is recommended that the proponent provide a summary translated in the language spoken by the concerned Aboriginal communities.

REFERENCES

Migratory Birds Environmental Assessment Guideline
www.ec.gc.ca/Publications/default.asp?lang=En&xml=890F4558-807A-4010-96A9-A3CC9CE34CC8

Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada
www.ec.gc.ca/Publications/default.asp?lang=En&xml=5407909E-10F6-4AFE-ACDF-75B9E820B4A1

Guide for Impact Assessment on Birds
www.ec.gc.ca/Publications/default.asp?lang=En&xml=EFDCD467-B236-44C8-AC02-3C817CF5CB04

Environmental Assessment Guideline for Forest Habitat of Migratory Birds
www.ec.gc.ca/Publications/default.asp?lang=En&xml=EE79D1F4-BBF9-4FBF-8278-B907877E9CA3

Available databases on bird species:

Atlas of the Breeding Birds of Southern Quebec (Gauthier and Aubry 1995)
www.quebecoiseaux.org

Étude des populations d'oiseaux du Québec (EPOQ)
www.quebecoiseaux.org

Suivi de l'occupation des stations de nidification des populations d'oiseaux en péril du Québec (SOS-POP)
www.quebecoiseaux.org

The Regroupement QuébecOiseaux (RQO) has or manages other bird databases that may be useful. More information on the databases is available on its website at www.quebecoiseaux.org .
4545 Pierre de Coubertin Avenue
P.O. Box 1000, Stn. M
Montreal QC H1V 3R2
Telephone: 514-252-3190

BirdMap Canada
www.bsc-eoc.org/birdmap_e.htm

Wetlands

Wetlands Environmental Assessment Guideline. Environment Canada, Canadian Wildlife Service, 1998, by Robert Milko, 20 pp.
www.ec.gc.ca/Publications/default.asp?lang=En&xml=0D3880BC-9519-4FF9-A294-DCAF9E54C8B2

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Canadian Environmental Assessment Agency, 2000. Using Ecological Standards, Guidelines and Objectives for Determining Significance – An Examination of Existing Information to Support Significance Decisions Involving Wetlands. Prepared by Lynch-Stewart & Associates for the Research and Development Monograph Series, Research supported by the Canadian Environmental Assessment Agency's Research and Development Program, 109 pp.
www.ceaa.gc.ca/default.asp?lang=En&n=46DA6C97-1&offset=1&toc=show

Wetland Ecological Functions Assessment: An Overview of Approaches
www.ec.gc.ca/Publications/default.asp?lang=En&xml=B8737F25-B456-40ED-97E8-DF73C70236A4

Barnthouse, L.W., W. R. Munns Jr. and M. T. Sorensen. 2008. "Population-Level Ecological Risk Assessment". CRC Taylor and Francis, NY. Society of Environmental Toxicology and Chemistry.

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Canada. 2003. A Framework for the Application of Precaution in Science-Based Decision Making About Risk. Accessed January 15, 2009
www.pco-bcp.gc.ca/docs/information/publications/precaution/precaution-eng.pdf

Canadian Environmental Assessment Agency. Operational Policy Statement. 2007. Addressing 'Need for', 'Purpose of', 'Alternatives to' and 'Alternative Means' under the *Canadian Environmental Assessment Act*
http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=5C072E13-1

Canadian Environmental Assessment Agency. Operational Policy Statement. 2007. Addressing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*
http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=1F77F3C2-1

Canadian Environmental Assessment Agency. Procedural Guide. 2003. "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners," prepared by the Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment
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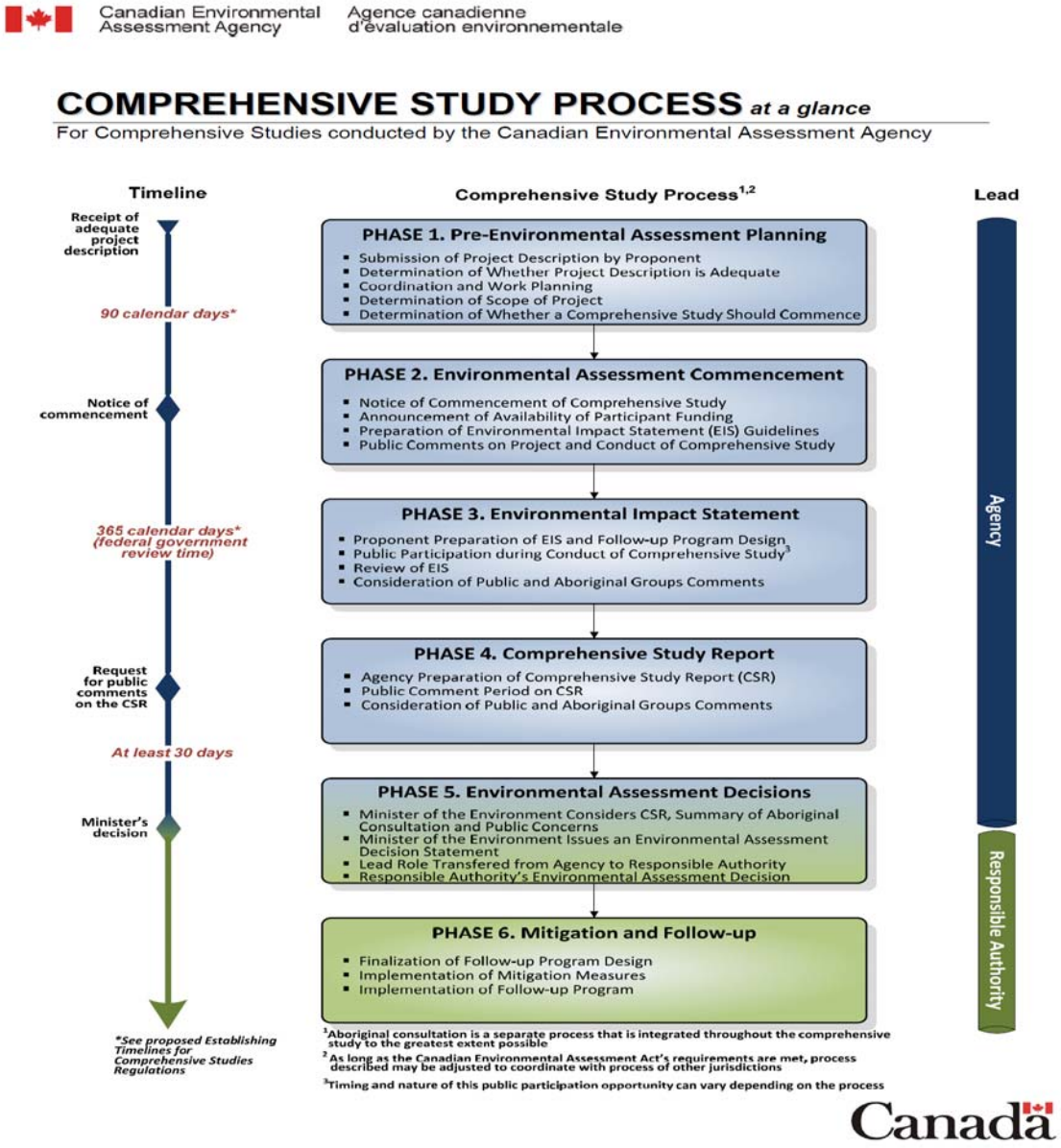
APPENDICES

Appendix 1: Comprehensive study process



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