



**COMPREHENSIVE STUDY REPORT FOR STRATECO  
RESOURCES INC.'S PROPOSED ADVANCED URANIUM  
EXPLORATION PROJECT, MATOUSH (QUÉBEC)**

**CANADIAN NUCLEAR SAFETY COMMISSION  
ENGLISH VERSION**

**July 2011**

**CEAR #08-00-46115**



This Comprehensive Study Report (CSR) consists of both the Federal Review Panel – South's *Recommendations Report* and an addendum to the FRP-S report that contains the CNSC staff assessment of additional information provided by the proponent.



**RECOMMENDATIONS REPORT  
MATOUSH URANIUM EXPLORATION PROJECT (QUEBEC)  
FEDERAL REVIEW PANEL SOUTH (FRP-S)**

**CANADIAN NUCLEAR SAFETY COMMISSION**

**July 2011**

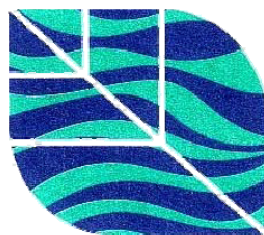
**CEAR #08-00-46115**



# Recommendations report

## Matoush Uranium Exploration Project Quebec

**FEDERAL REVIEW PANEL SOUTH (FRP-S)**



**May 2011**

Photo – Visit to Matoush site, October 2010.

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*In the text, bibliographic references to the submissions sent by participants and the transcripts from public hearings are indicated by a numerical reference, i.e., "(M-)" and "(V-)"*.

*All quotes attributed to the proponent were translated from French into English.*

## ACRONYMS

<b>ATO Park:</b>	Albanel-Témiscamie-Otish National Park
<b>CCME:</b>	Canadian Council of Ministers of the Environment
<b>CBHSSJB:</b>	Cree Board of Health and Social Services of James Bay
<b>CEAA:</b>	<i>Canadian Environmental Assessment Act</i>
<b>CHB:</b>	Cree Health Board
<b>CHRD:</b>	Cree Human Resources Department
<b>CNSC:</b>	Canadian Nuclear Safety Commission
<b>FRP-S:</b>	Federal Review Panel South (s. 22 JBNQA)
<b>COMEV:</b>	Evaluating Committee (s. 22 JBNQA)
<b>COMEX:</b>	Provincial Review Committee (s. 22 JBNQA)
<b>COPC:</b>	Contaminants of potential concern
<b>COTA:</b>	Cree Outfitters and Tourism Association
<b>CPAWS:</b>	Canadian Parks and Wilderness Society – Quebec Chapter
<b>CRA:</b>	Cree Regional Authority
<b>CRÉ:</b>	Conférence régionale des élus
<b>CRÉBJ:</b>	Conférence régionale des élus de la Baie-James
<b>CRRNTBJ:</b>	Commission régionale sur les ressources naturelles et le territoire de la Baie-James
<b>CSSS-Sept-Îles:</b>	Centre de santé et de services sociaux de Sept-îles
<b>ERA:</b>	Ecotoxicological risk assessment
<b>GCC(EI):</b>	Grand Council of the Crees (Eeyou Istchee)
<b>IBA:</b>	Impacts and Benefits Agreement
<b>JBNQA:</b>	James Bay and Northern Quebec Agreement
<b>KRG:</b>	Kativik Regional Government
<b>LETI:</b>	Landfill site in remote area
<b>MAMROT:</b>	Ministère des Affaires municipales, des Régions et de l'Occupation du territoire
<b>MDDEP:</b>	Ministère du Développement durable, de l'Environnement et des Parcs
<b>MBJ:</b>	Municipalité de la Baie-James
<b>MMER:</b>	<i>Metal Mining Effluent Regulations</i>
<b>MRNF:</b>	Ministère des Ressources naturelles et de la Faune
<b>MTQ:</b>	Ministère des Transports du Québec
<b>NDQ:</b>	Nord du Québec
<b>VEC:</b>	Valued environmental component

**Members of the Federal Review Panel South (FRP-S) who participated in reviewing and preparing the report:**

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Anne-Marie Gaudet (until October 2010)  
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Philip Awashish  
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**Executive Secretariat:**

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## EXECUTIVE SUMMARY

### OVERVIEW

Strateco Resources (the proponent) proposes to construct an underground ramp to undertake an advanced mining exploration phase on *James Bay and Northern Quebec Agreement* (JBNQA) territory, northeast of Mistissini (210 km) and of Chibougamau (275 km). The purpose of this project is to describe fully reveal the mineral reserves of the Matoush uranium deposit and to determine the feasibility of a large-scale mining project. The construction and excavation work on the underground ramp should be completed within 18–24 months. Subsequently, the underground exploration program is planned to take 12–18 months.

The proponent first contacted the Mistissini Cree Band Council in 2006. In 2007, it made presentations to the general public and the Chibougamau Chamber of Commerce. From 2008 onward, following the decision to conduct an underground exploration program on the Matoush site, Strateco undertook its information and consultation activities with the Mistissini Cree community and the residents of Chibougamau.

The preliminary information on the project was sent to the federal and provincial administrators of the JBNQA in August 2008. This information was presented to the evaluating committee (COMEV) to prepare recommendations for the administrators regarding whether this project is subject to the impact assessment and review process. In September 2008, COMEV recommended that the project be subject to a social and environmental assessment. A recommendation for a directive was sent to the two administrators in February 2009.

The directive proposed by COMEV was developed to meet federal and provincial requirements. With the assistance of the Canadian Nuclear Safety Commission (CNSC), the federal members of COMEV also sent the proponent additional requirements.

The Federal Review Panel South (FRP-S) received its mandate from the Federal Administrator in March 2009. The proponent prepared an environmental assessment that it submitted to FRP-S in November 2009.

Information sessions, meetings and consultations with the communities were organized by the proponent, the CNSC and FRP-S. Two public hearings were held jointly by FRP-S and

the provincial review committee (COMEX). FRP-S then completed its analysis based on all the material gathered, including the proponent's environmental impact statement, the information provided by the Aboriginal communities, technical advice and public comments.

## **KEY ENVIRONMENTAL AND SOCIAL ISSUES**

The environmental impact statement should take into consideration the following factors:

- environmental and social effects of the project, including the environmental effects of malfunctions or accidents;
- cumulative effects;
- 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;
- capacity of renewable resources that are likely to be significantly affected by the project.

As for the analysis of the environmental and social effects, the proponent should document the implications of its project on the following components:

- water resources;
- air and soil quality;
- terrestrial and aquatic vegetation;
- wildlife species at risk or special status species and their habitats;
- terrestrial wildlife and habitat;
- avian fauna;
- fish and fish habitat;
- human health;
- quality of life and cultural setting;
- economic benefits;
- land use;
- heritage and archaeological resources.

During the consultations by FRP-S, the following concerns were raised more than once by different parties:

- degradation of the environment, in particular, water resources;
- employment and training opportunities;

- perceived risk associated with the operation or storage of radioactive materials;
- cumulative effects;
- social acceptability of the project.

Overall, FRP-S is not entirely satisfied with the proponent's response to the additional information requests that they received during the environmental assessment process. In certain cases, for example, regarding the effects of effluent discharge on water quality, the uncertainty or persistent doubt led FRP-S to develop several recommendations regarding mitigation measures and follow-up. In addition, public support for this project remains precarious, due in part to the issues surrounding the development and use of uranium, as well as the fact that the proponent did not demonstrate as much transparency as some participants had hoped. The proponent needs to build a relationship based on trust with the members of the Mistissini community.

#### **MITIGATION MEASURES AND FOLLOW-UP**

The mitigation measures of the environmental effects that must be implemented and that are technically and economically feasible include those that Strateco planned while designing the project, as described in the environmental impact statement and as proposed in the additional information that it provided. The mitigation measures also include those measures proposed by FRP-S to the Federal Administrator, as well as those that will be integrated by the CNSC under their licensing conditions. As an additional precautionary measure and given the nature of the project, FRP-S recommends that adaptive management measures be implemented for several components to ensure the predictive accuracy of the environmental impact statement and the effectiveness of the chosen mitigation measures.

Due to the concerns raised and the uncertainties inherent in environmental assessments, FRP-S is of the opinion that various programs will be necessary to ensure project follow-up on the anticipated effects and the effectiveness of any measures taken to mitigate environmental effects. In addition, if the project is approved by the provincial and federal administrators as well as by the CNSC, the proponent must also satisfy all the additional requirements of the Government of Quebec and the CNSC regarding follow-up and mitigation measures.

#### **OUTSTANDING ISSUES**

The environmental assessment of the Matoush exploration project was undertaken with three major implicit constraints, in particular, the fact that the underground exploration project could

lead to a phase of mining development. The first constraint is the need for an adequate description of the environment and consideration of the impacts of the proponent's projects that are related to the underground ramp. To that effect, FRP-S recommends including a detailed description of the initial conditions of the environment (water, sediment, fish, terrestrial and aquatic wildlife and plants) in the follow-up requirements.

The second constraint is the project's social acceptability, whether it is regarding the opposition of the Mistissini Cree community or the requests for a moratorium on exploration and development of uranium in Quebec. Other than the opposition expressed regarding the project, several participants mentioned that a number of their questions were not answered to their satisfaction during the last public hearings held in Mistissini in November 2010, in particular, the reason for developing uranium deposits on JBNQA territory. However, FRP-S is not mandated to answer that question. Moreover, in response to those concerns, the proponent agreed to establish a local monitoring committee and has awarded a contract to the Cree Mineral Exploration Board to facilitate the exchange of information with the community of Mistissini.

The third constraint relates to changes to project components during the analysis by FRP-S. For example, in March 2011, the proponent revoked its authorization request to improve the old winter road from the Eastmain mine, and in April 2011, the CNSC informed FRP-S that the proponent had presented the CNSC with a variation in the location of the final effluent discharge. In this last case, the risk assessment will have to be revised to include the possible effects on aquatic wildlife and its habitat.

## **CONCLUSION AND RECOMMENDATION**

Given the nature of the project that distinguishes it from other types of mining activities in Quebec, FRP-S is of the opinion that acceptance of the project at the local and regional levels is a key factor and recommends that the results of the steps and proposed measures for the environmental characterization, the ecotoxicological risk assessment and the social acceptability of the project be presented by the proponent to the Federal Administrator and the CNSC before deciding on whether to issue an authorization permitting the advanced exploration work at the Matoush camp.

Subject to the proponent's compliance with these conditions and to circumstances for the project's social acceptability being improved, FRP-S is satisfied that the project, following the implementation of the measures and conditions summarized below, is not likely to result in significant adverse environmental and social effects or to infringe on the principle of



protecting the Cree people's way of life. FRP-S therefore recommends that the Federal Administrator authorize the project described in the environmental impact statement and follow-up documents, conditional on the proponent's following the recommendations and meeting the conditions set out in this document, which relate to the following:

- mine effluent and its location (section 6.3.4);
- location of the drinking water intake (section 6.3.4);
- presence of a Cree coordinator to provide employment and worker support (section 6.9);
- emergency measures in case of an accident, malfunction or spill at the site and the coordination of those measures with the appropriate local and regional organizations (sections 7 and 8);
- revision of the follow-up measures (section 11) regarding:
  - air quality;
  - quality of surface water, groundwater and sediment, including inflow and effluent;
  - wildlife, plants and species at risk;
  - human health;
  - economic benefits.

In the event that an authorization request for a uranium mine project should be submitted following the conduct of the advanced exploration activities, FRP-S recommends that this be immediately subject to a joint JBNQA-*Canadian Environmental Assessment Act* (CEAA) federal review panel, as strong concerns were expressed at the FRP-S-held public hearings regarding the development of a mine and a uranium processing plant on JBNQA territory.

## 1 INTRODUCTION

In March 2009, the Federal Review Panel South (FRP-S) was mandated by the Federal Administrator to assess the environmental and social impacts of a uranium mining exploration project on *James Bay and Northern Quebec Agreement* (JBNQA)<sup>1</sup> territory.

This project, proposed by Strateco Resources (the proponent), involves the construction of an underground ramp to carry out an advanced mining exploration phase on JBNQA territory, northeast of Mistissini (210 km) and Chibougamau (275 km). The purpose of this project is to fully reveal the mineral reserves of the Matoush uranium deposit and determine the feasibility of a large-scale mining project. Construction and excavation work on the underground ramp should be completed within a period of 18–24 months. The subsequent underground exploration program will take an estimated 12–18 months. The proponent prepared an environmental assessment, which it submitted to FRP-S in November 2009.

This report summarizes the key analyses and observations by the parties concerned, i.e., the proponent, groups and members of the public, federal authorities and FRP-S. It also details the recommendations and findings of FRP-S for the Federal Administrator. As the project is subject to both processes set out in section 22 of the JBNQA and the *Canadian Environmental Assessment Act* (CEAA), this report is also of interest to the Canadian Nuclear Safety Commission (CNSC), which could potentially be required to exercise its authority after the comprehensive study of the project.

After reviewing the regulatory framework (section 2), project components (section 3), scope of the environmental and social assessment (section 4) and public consultations (section 5), section 6 of the report briefly summarizes the current conditions of the key environmental and social components reviewed, as well as the analyses by the proponent, the public and FRP-S. Each section also presents, as appropriate, FRP-S' recommendations and conclusions pursuant to section 22 of the JBNQA and/or the CEAA.

Sections 7–10 present the observations and findings on the environmental impacts of the project, accidents and malfunctions, cumulative effects and the sustainability of renewable resources, all of which must be included in an environmental assessment conducted pursuant to the CEAA.

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<sup>1</sup> The *James Bay and Northern Quebec Agreement* (JBNQA) is the first modern land claim agreement in Canada. Signed in 1975, the JBNQA sets out an environmental and social protection regime for the territorial regions of James Bay and Nunavik.

Finally, after a discussion of monitoring and follow-up requirements (section 11), section 12 presents the overall findings and recommendations from the FRP-S review.

## 2 REGULATORY FRAMEWORK

The Matoush uranium exploration project proposed by Strateco Resources is located on JBNQA territory and is subject to review in accordance with the requirements set out in section 22 of the JBNQA. A comprehensive study-type environmental assessment is also required under the CEEA.

### 2.1 JAMES BAY AND NORTHERN QUEBEC AGREEMENT

For the territory covered by the JBNQA (see map, Appendix 1), the environmental and social protection regime under section 22 of the Agreement establishes a two-stage procedure for assessing and reviewing a project's environmental and social impacts, headed by a government decision-maker, referred to as "the Administrator". The president of the Canadian Environmental Assessment Agency acts as the Federal Administrator for federal projects, with the responsibility of granting or denying authorization to projects on Category II and III lands, based on the recommendations of the assessment and review committees. Quebec's Deputy Minister of the Environment acts as Provincial Administrator for provincial projects within these same land categories.

Owing to its uranium component and to the nature of the proposed work (mining exploration), the project falls under joint federal-provincial jurisdiction and is subject to decisions by the Federal and Provincial Administrators named under section 22 of the JBNQA.

#### 2.1.1 Evaluating Committee directive

Preliminary information on the project was sent to the Evaluating Committee (COMEV) on August 11, 2008 to prepare recommendations for both Administrators regarding whether the project was subject to the impact assessment and review process. On September 19, 2008, COMEV recommended that the project be subject to a social and environmental assessment. A recommendation that a directive be established defining the elements to be covered by the proponent in its impact study was sent to the two Administrators on February 17, 2009.

In its directive, COMEV recommended that the impact assessment specifically examine risks and impacts relating to radioactivity and, specifically, to groundwater, surface water and air quality. In light of the concerns potentially associated with uranium exploration and mining, COMEV also

suggested that the proponent consult with the communities concerned by the project—taking into consideration the operational phase—in order to assess the project’s overall acceptability and to respond to concerns expressed by the community.

The directive proposed by COMEV was developed to meet federal and provincial requirements. However, after consulting with the CNSC, the federal members of COMEV also included in the directive an addendum setting out a number of CNSC requirements.

On March 31, 2009, the Federal Administrator delivered to Strateco Resources its decision to subject the advanced exploration project to an environmental and social impact review, along with the directive (including the addendum) defining the scope of the impact study to be filed. This decision, the directive and the addendum are presented in Appendix 2.

### **2.1.2 Mandate of the Federal Review Panel South**

FRP-S is an independent panel established pursuant to section 22 of the JBNQA to review projects under federal jurisdiction within the territory covered by the agreement. It is composed of two members appointed by the Cree Regional Authority (CRA), as well as two members and a president appointed by the Government of Canada. On March 31, 2009, the Federal Administrator commissioned FRP-S to review the project and prepare recommendations in regards to authorizing the project and to related conditions (Appendix 3).

When FRP-S was given this task, the environmental assessment process under the CEAA was replaced by that under the JBNQA, in accordance with the decision by the Quebec Court of Appeal (*Moses v. Canada [Attorney General]* 2008 QCCA 741) concerning a vanadium mining project planned on the territory covered by section 22. In that case, the scope of the environmental assessment and any procedures governing the assessment, from the perspective of federal procedure, were under the jurisdiction of the Federal Administrator.

In its May 14, 2010, judgment on appeal in the same case (*Quebec [Attorney General] v. Moses*, 2010 SCC 17), the Supreme Court of Canada held that the CEAA was applicable and that substitution by the environmental assessment procedure provided under the JBNQA was no longer applicable. Since that substitution no longer had a purpose, the federal procedure set out in section 22 of the JBNQA remained applicable in parallel with that of the CEAA. However, to harmonize the process the CNSC—in assuming authority under the CEAA—proposed on September 10, 2010 that responsibility for conducting the comprehensive study, holding public consultations and preparing

the report be delegated to FRP-S. The Federal Administrator approved this recommendation on October 18, 2010 (Appendix 3).

Responsibility for the environmental assessment is delegated under section 17 of the CEAA, which provides that a responsible authority for a project may delegate the preparation of the screening report, comprehensive study report, corresponding reports and any part of the design and implementation of a follow-up program, but not the duty of decision making with respect to project approval. Section 17(2) goes on to stipulate that a responsible authority must be satisfied that any duty or function so delegated has been carried out in accordance with the CEAA and the regulations made thereunder.

In short, two federal authorities—the CNSC and the Federal Administrator—will each have to make the decision on the project. Under the CEAA, the Minister of the Environment will also have to issue a decision statement on the project after obtaining public input on the comprehensive study report. If the Minister’s decision—while taking into account the implementation of the mitigation measures—is that the project is not likely to cause significant adverse environmental effects, the CNSC will proceed in accordance with section 37(1) for a regulatory decision under the *Nuclear Safety and Control Act*.

### **2.1.3 Collaboration with the provincial review committee**

Collaboration between the federal and provincial review committees focused on information exchange and harmonization of review processes, particularly in regards with the holding of joint public consultations. Discussions to foster cooperation between the provincial (COMEX) and federal (FRP-S) review committees were initiated in spring 2009 and a joint work schedule was in place by May 2010.

### **2.1.4 Principal stages of review**

In the course of its review, FRP-S held close to 20 working meetings, including a number of joint meetings with COMEX and the federal departments concerned. The following key stages were completed:

**Table 2.1 Principal stages of review**

Date	Stage
March 31, 2009	Initial mandate from Federal Administrator received by FRP-S
November 10, 2009	Receipt of impact assessment (volumes I, II, III, IV) <sup>2</sup>
April 29, 2010	Transmission of FRP-S' request for additional information to proponent
May 25–26, 2010	Phase I of joint public consultations (briefing sessions by FRP-S/COMEX)
August 20, 2010	Receipt of English and French versions of additional information from proponent
October 16, 2010	Inspection of Matoush camp facilities by representatives of FRP-S, CNSC and CRA (Appendix 4)
October 18, 2010	Delegation of comprehensive study preparation to FRP-S
November 23–25, 2010	Phase II of joint public consultations (public hearings by FRP-S/COMEX)
January–May 2011	Preparation of report on recommendations

There will be additional activities to those described in Table 2.1, specifically, consultation on the comprehensive study report and regulatory hearings under the CNSC.

## **2.2 CANADIAN ENVIRONMENTAL ASSESSMENT ACT**

Pursuant to section 5(1) of the CEAA, an environmental assessment of a project is required where a federal authority is the proponent of the project, provides financial assistance to the proponent, authorizes the sale or lease of federal lands necessary for the project or issues a licence or other authorization for the project under the terms of a regulatory provision. Those powers are said to trigger the CEAA and, consequently, an environmental assessment must be prepared to determine whether the project is likely to cause significant adverse environmental effects. Only when this has been determined can the federal authorities decide whether they should exercise their powers with respect to the project in question.

<sup>2</sup> The French versions of volumes II, III and IV were submitted by the proponent on February 15, 2010.

### **2.2.1 Roles of the Canadian Nuclear Safety Commission**

The CNSC plays a dual role in the project: (1) as the responsible authority under the CEAA and (2) as the regulatory authority for nuclear safety.

Under the CEAA, the licence that the CNSC may issue pursuant to the *Nuclear Safety and Control Act* triggers the environmental assessment process and confirms the CNSC in its role of responsible authority as defined in the CEAA. Since the project includes advanced uranium exploration activities—specifically, the construction of a 2,400-metre exploration ramp and groundwater extraction—it must undergo a comprehensive study in accordance with the *Comprehensive Study List Regulations*.

Moreover, as the regulatory agency, the CNSC must determine whether it will issue a licence for site preparation and construction of the project under study. The *Uranium Mines and Mills Regulations* describe the requirements applicable to the various stages in the life cycle of a uranium exploration ramp, mine or mill for which the CNSC issues separate licences. Section 24(4) of the *Nuclear Safety and Control Act* states that no licence may be issued by the CNSC unless, in the latter's opinion, the applicant:

- is qualified to carry on the activity covered by the licence
- will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

The *Nuclear Safety and Control Act* and its Regulations require applicants or licensees to take the necessary measures to ensure that existing or proposed facilities operate and are decommissioned safely. This includes developing acceptable decommissioning plans, submitting credible cost estimates for implementing decommissioning plans, providing ways of ensuring decommissioning funding and, finally, implementing and completing decommissioning plans as accepted.

### **2.2.2 Roles of other federal departments**

In the context of this environmental assessment, specialists from Health Canada and Environment Canada provide expertise and offer opinions on the project issues calling for their respective competencies in order to help the responsible authority—the CNSC—reach a decision in accordance with the CEAA.

The Canadian Environmental Assessment Agency (the Agency) administers the Participant Funding Program, which supports individuals, Aboriginal groups and non-profit organizations that wish to participate in a comprehensive study or panel review. In the context of this environmental assessment, the Agency will also coordinate consultation on the comprehensive study report under section 22 of the CEAA.

### **2.3 PUBLIC CONSULTATION**

For the last 35 years, public participation has been an important aspect of the environmental assessment of projects launched on JBNQA territory. Not only is it recognized under section 22 of the JBNQA as an intrinsic activity in project review, public participation of the host communities for these projects enjoys special status. Under section 22.2.2.2(c), consultation with the Cree plays a crucial role in the protection of the rights and guarantees conferred to them by the JBNQA. In particular, the JBNQA highlights the need for increased participation by Cree communities by affirming as a fundamental principle the importance of granting special status for consultation or representation mechanisms to enable special participation by the Cree, thereby ensuring greater participation from that group than normally provided for the general public.

The CEAA also expresses the importance of public participation by stating in the Preamble that the federal government is committed to facilitating public participation in the environmental assessment of projects to be carried out by or with the approval or assistance of the Government of Canada and providing access to the information on which those environmental assessments are based. Two specific purposes are set out in section 4(1) of the CEAA: (1) to promote communication and cooperation between responsible authorities and Aboriginal peoples with respect to environmental assessments; and (2) to ensure there are opportunities for timely and meaningful public participation throughout the environmental assessment process. Section 21.2 stipulates that the public shall be provided with an opportunity to participate in the comprehensive study.

As a fundamental element in the environmental planning of a project, public participation also involves the project proponent. Current practice would have it establish a consultation method adapted to the communities concerned and ensure that it provides information and consults with or involves the communities potentially affected by, or capable of influencing, the project.



## **2.4 ABORIGINAL CONSULTATION**

In the development project licensing process, the courts have ruled that the Crown has an obligation to consult with and, in some cases, accommodate Aboriginal people. A number of decisions by the courts have defined this obligation, including *Haida (Haida Nation v. British Columbia [Minister of Forests]*, [2004] 3 S.C.R. 511, 2004 SCC 73), *Taku River (Taku River Tlingit First Nation v. British Columbia [Project Assessment Director]*, [2004] 3 S.C.R. 550, 2004 SCC 74), and *Mikisew (Mikisew Cree First Nation v. Canada [Minister of Canadian Heritage]*, [2005] 3 S.C.R. 388, 2005 SCC 69). Case law on this issue is still evolving.

The duty of consultation flows from the honour of the Crown principle, which holds that the Crown (or an agent thereof) must consult with Aboriginal people and, where applicable, accommodate their interests when the Crown is aware of an acknowledged or claimed existing, ancestral or treaty-based right, and when it expects to make a decision that could interfere with the exercise of that right.

As agents of the Crown, the CNSC and the Federal Administrator must—in making decisions—take into account the rights granted to the Cree by the JBNQA as well as the impacts of the project on them. In order to do so, the consultation activities by the CNSC itself and by FRP-S shall be taken into account, as shall any activities conducted by Strateco.

Given its mandate, those principles governing consultation with the public and the Cree define a special role for FRP-S, which must be reflected in this report, so that the Federal Administrator and the CNSC can ensure that the various participation activities were executed in full.

Funding has been granted under the Agency's federal Participant Funding Program to support Cree groups participating in public consultation activities on the project.

## **2.5 TERRITORY COVERED BY AGREEMENT AND ORGANIZATION**

The guiding principles of the JBNQA stipulate that development of resources on the territory must acknowledge the needs of the Cree, whose culture and lifestyle differ from those of other Quebecers. In this sense, different institutions work to ensure environmental and social protection. The Grand Council of the Crees (*Eeyou Istchee*; GCC[EI]) and the CRA are two separate legal entities, but their boards of directors consist of the same members. The GCC(EI) represents the nine Cree communities, and is empowered and has authority to promote and protect the traditional lifestyle and values of the Cree as well as the development of Cree communities and the territory.

The Cree community of Mistissini is the community located closest to the project, although the Nemaska community's traplines are also located nearby. The Cree ensure resource and territorial planning are done in accordance with the provisions of the JBNQA, the Agreement Concerning a New Relationship between the Government of Quebec and the Crees of Quebec (Paix des Braves) and the Agreement concerning a New Relationship between the Government of Canada and the Cree of Eeyou Istchee. The current system of Cree traplines and the locations of the beaver reserves presently allocated to Cree families are recognized by the JBNQA and they must be maintained (JBNQA, section 24.3.25). The Matoush project is located on Category III lands; i.e., areas open to Aboriginal and non-Aboriginal people, subject to the rights, conditions and restrictions set by the Agreement (JBNQA, section 34.3.32). The Hunting, Fishing and Trapping Coordinating Committee manages, supervises and regulates the Hunting, Fishing and Trapping Regime (JBNQA, section 24.4.1).

Created in 1971, the Conseil de la Municipalité de la Baie-James (MBJ) was reformed under section 61 of the *Quebec Act* of 2001. This council is composed of the mayors of the towns of Chapais, Chibougamau, Lebel-sur-Quévillon and Matagami. The chairpersons of the Radisson, Valcanton and Villebois communities also sit on the council. The municipality and the four towns belong to the Conférence régionale des élus de la Baie-James (CRÉBJ). The municipality extends north from the 49th to the 55th parallel and east from Quebec's western boundary to the ridings of Roberval, Dubuc and Saguenay, excluding Category I lands. The CRÉBJ was incorporated under the *Act respecting the ministère des Affaires municipales, des Régions et de l'Occupation du territoire*. Cree institutions are not part of the Conseil de la MBJ or of the CRÉBJ.

Territorial governance is a matter under dispute between the GCC(EI)/CRA and the Government of Quebec (*Cree Vision of Plan Nord, 2011; GCC[EI]/CRA Annual Report 2008–2009*). The conflict is described briefly here to explain the current context behind territorial organization and to identify issues associated with its planning. Despite the signed agreements and the participation of the GCC(EI)/CRA in provincial territorial planning initiatives, such as the Plan Nord, it is the view of the GCC(EI)/CRA that the Government of Quebec has not yet implemented the James Bay Regional Zone Council (JBNQA, section 11B) and that passage of the *Act to Amend the James Bay Region Development Act* and other legislation (Bill 40, 2001, c. 61) in 2001 conflicts with the JBNQA.

This Act changed the composition of the Conseil de la MBJ by restricting it to non-First Nations representation. In the view of the GCC(EI)/CRA, by so doing the Government of Quebec excluded the Cree from management of Category II and III lands, which are their traditional territory. According to the GCC(EI)/CRA, the MBJ is illegal and unconstitutional, as are the CRÉBJ and the

Commission régionale sur les ressources naturelles et le territoire de la Baie-James (CRRNTBJ), which are controlled by the MBJ. On the one hand, the GCC(EI)/CRA does not accept the limitation of the CRA's role to Category I lands or the CRÉBJ's role as special liaison for land and resources planning on Category II and III lands. On the other, the Government of Quebec continues to assert its position pursuant to the *Act respecting the ministère des Affaires municipales, des Régions et de l'Occupation du territoire*, introducing three regional conferences of elected officials (CRE): one covering the MBJ territory and four other towns, with the CRA and the Kativik Regional Government (KRG) functioning as the CRE for their respective communities. The Act provides a mechanism enabling the CRA, KRG and CRÉBJ to coordinate their authority and responsibilities. MAMROT is concluding individual management and other agreements with each CRE. The CRÉBJ has signed a special agreement to implement integrated and regionalized management by the ministère des Ressources naturelles et de la Faune (MRNF) for the Nord du Québec region, Baie-James sector. The agreement covers the establishment of the CRRNTBJ and development of a regional plan for the integrated development of natural and land resources to enable the region to play a greater role in the development of natural and territorial resources by implementing catalyst projects. The Government of Quebec funds CRE activities through the Regional Development Fund.

With the introduction of Plan Nord and given the project to extend Route 167-N to the Otish Mountains, the multitude of projects focusing on mining exploration and exploitation, the creation of conservation parks, and resource or tourism development, FRP-S notes the absence of a regional vision on development. Environmental assessments are conducted one project at a time, which renders impossible the consideration of the combined effects the environmental and social impacts of all the projects will have in the coming years.

FRP-S is of the view that, without representation by the Cree and their organizations on certain land use planning bodies, it is uncertain whether the principles of the Agreement, particularly those preaching development in harmony with Cree values and environmental protection, will be respected. Two separate cultures inhabit the territory, and the Cree and other James Bay residents are not cut from a single cloth. A strategic vision of land use development is essential and would also allow to define certain debates, even conflicts, to come.

### 3 PROJECT DESCRIPTION

#### 3.1 PURPOSE OF THE PROJECT

From its surface prospecting activities, the proponent identified a uranium deposit having mineral resources in the order of 20.2 million pounds of uranium ( $U_3O_8$ ) with an average concentration of 0.60%  $U_3O_8$ . Strateco Resources now plans to assess the feasibility of economic development of this deposit by conducting an advanced underground exploration phase. The proponent accordingly proposes to excavate an underground exploration ramp from which to perform borehole drilling to define the deposit, to assess field conditions and the eventual mining method, and calculate the quantity of and treatment method for wastewater from the exploration ramp.

According to the proponent, demand for uranium has skyrocketed since 2000, as reflected in its increase in price. The proponent estimates that if the Matoush deposit can be exploited economically, uranium ore production will contribute to meeting global energy demand and the needs of other sectors such as nuclear medicine, food irradiation and farmland fertilization.

#### 3.2 TECHNICAL COMPONENTS OF PROJECT

##### 3.2.1 Underground work

Essentially, the work will involve installing a portal and excavating an underground ramp and exploration drifts for borehole drilling (see Map 1). Underground excavation will be done primarily in waste rock. Ground conditions and mining methods will be assessed through openings in the mineralized zone at the -165 m level.

The exploration ramp will be 5 m high and 5 m wide to accommodate rolling stock for rock removal. The total length of the ramp is estimated at 2.4 km and the total vertical depth at 320 m.

A bay will be excavated to wash equipment and vehicles before they are cleared for mechanical service on the surface. The wash bay will be equipped with a pumping system to contain all the wash water subsequently pumped to the surface toward the treatment plant.

The ventilation raise will be used to evacuate air contaminated by excavation and drilling activities.

### **3.2.2 Access**

A 130-km stretch of the former winter road to the Eastmain mine (extension of Route 167-N) provides access to the Matoush camp. Since 2007, the proponent has obtained approvals from the MDDEP and MRNF for the reconstruction and use of the winter road to the Matoush camp for the winter season. Moreover, extension of Route 167-N by the ministère des Transports du Québec (MTQ) is currently undergoing an environmental assessment, i.e., a comprehensive study by the Agency pursuant to the CEEA.

A 12-km access road connecting the winter road to the camp is already in place. To improve its safety and facilitate winter transportation, the proponent would like to straighten the access road over a stretch 10 km long and 6 m wide. Significant upgrades would be made to straighten road contours, drainage culverts would be installed and material would be added to the road surface to meet the demands of additional heavy vehicle traffic. The proponent also plans to construct short sections of side roads on the site to provide access to the ramp entrance from the camp and access road.

For the time being, air access is available year-round. A permanent airstrip located approximately 6 km southwest of the camp was built in 2010.

### **3.2.3 Tree clearing and borrow pits**

The impact assessment mentioned that the infrastructure footprint will cover approximately 15 ha, which includes infrastructure associated with the ramp, overburden, camp expansion, access and water basins. The surface area of zones yet to be cleared in order to install the proposed infrastructures is about 3 ha, while 12 ha have already been cleared since exploration work began. The soil (organic matter) layer excavated following tree clearing will be temporarily stored on a dedicated site and used for revegetation during the remediation process.

The proponent identified a total of 27 potential borrow pits within a 7-km radius of the camp, but their clearance is not included in the area calculated in the previous paragraph. For the purposes of this project, the estimated volume of material required for the construction and repair of surface infrastructures is 120,500 m<sup>3</sup>. At the time of filing the impact assessment, the proponent had not yet decided which borrow pits would be used.

Of all the borrow pits identified, Strateco Resources considered only about ten of use for construction materials. They were selected on the basis of volumes available, quality of material and access to the deposit. Priority was given to borrow pits already in use for which the necessary

licences and permits had been issued during previous activities. Material will be transported onsite by truck. No explosives will be used in borrow pit operations.

### **3.2.4 Surface infrastructure**

The current site infrastructure includes the following:

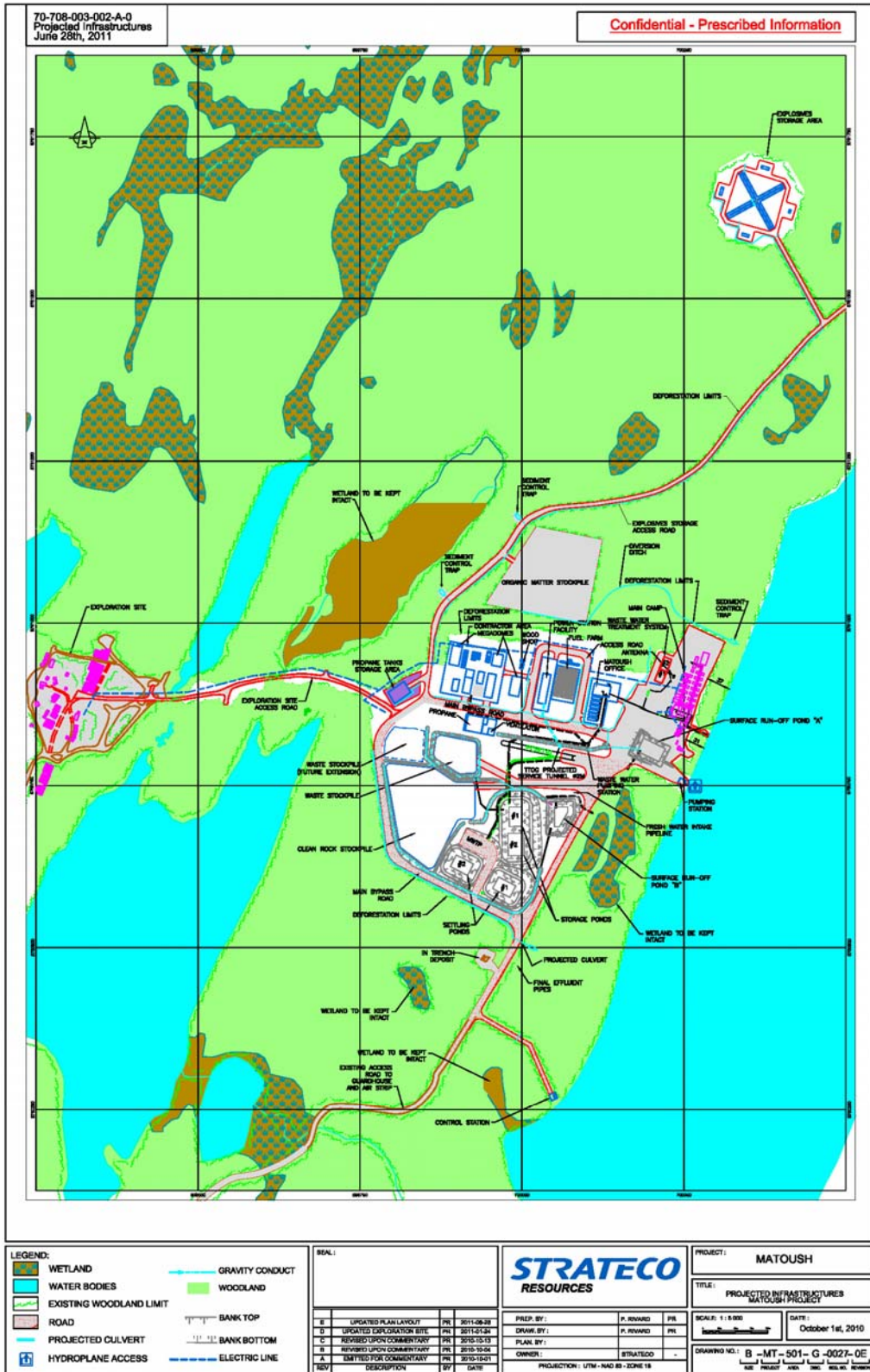
- a propane storage area
- garages and warehouses
- septic tanks and a seepage bed
- a fuel farm
- offices and the camp (kitchen, dormitories, washrooms, laundry, common area)
- a pumping station and drinking water treatment system
- a landfill site and a temporary contaminated soil storage site

For the purposes of the exploration project, additional surface infrastructure will include:

- space for housing, including additional dormitories
- a megadome and additional warehouses
- an underground exploration portal and a dry facility
- a power plant, equipped with four generators (three 1,500 kW and one 300 kW)
- a clean waste pad and a “special waste” pad
- surface runoff collection ponds
- water treatment ponds (sedimentary and settling ponds)
- a contaminated water treatment plant
- a pumping station
- a final effluent control station
- collection and drainage ditches

A large part of the energy generated by the power plant, which uses diesel fuel, will provide ventilation and supply the underground exploration program’s pumping system. The proponent states that energy demand for the exploration project will not exceed 2,900 kW.

Map 1. Surface infrastructure



### **3.2.5 Waste rock and ore management**

The underground ramp and its side extensions will be excavated in non-mineralized rock. This activity will produce about 130,000 m<sup>3</sup> of rock.

The proponent decided that if mineralized rock—i.e., presenting concentrations higher than 300 ppm of uranium ("special waste")—is discovered during the excavation, it will be stored on a surface (waste pad "A") designed to eliminate any risk of contaminants leaching into the underlying ground. A high-density polyethylene membrane will be deployed underneath the waste pad and over a compacted layer of sand. The membrane will first be covered by a sand layer roughly 30 cm thick, followed by a layer of till 60 cm thick to avoid potential damage from the heavy machinery traffic. The special waste pad will be surrounded by a berm and a ditch, also protected by a membrane. Surface water that comes into contact with the special waste pad will flow first into the ditch and then by gravity to the ramp's water treatment plant. The total surface of the pad is estimated at 3,000 m<sup>2</sup>.

Non-mineralized waste rock will be stored on a 14,300 m<sup>2</sup> surface (waste pad "B") surrounded by a ditch and classified according to its potential use: either unconditional or restricted. As was indicated in the information provided by the proponent, if the waste rock presents uranium grades inferior to 80 ppm ("unconditional"), it will be grouped in the southern part of waste rock pad "B." Any material containing uranium grades between 80 and 300 ppm ("restricted") will be placed in the northern part of the same pad. If uranium grades higher than 300 ppm are recorded, the rock pile in question will be moved to the special waste rock storage area.

Waste rock presenting uranium grades below 80 ppm may be used without restrictions, even offsite. Waste rock presenting uranium grades between 80 and 300 ppm is still considered waste, but its use is limited to the project site and certain conditions will apply during remediation activities.

The ore (750 tonnes) from the underground exploration work in the mineralized area will be held in an underground storage bay for future processing.

### **3.2.6 Water management**

To avoid contact between runoff water and surface infrastructure, the proponent decided to construct a drainage system on the site perimeter to capture runoff water and divert it straight into the environment.



Water from the northern section of the site (6.5 ha) that has not come into contact with the special waste rock pad will flow via the drainage ditches into a holding pond (runoff collection pond “A”). The pond will have a bituminous membrane and a capacity of 2,590 m<sup>3</sup> of water. An emergency spillway will permit the water to be emptied into the lake in the event of exceptional rainfall.

Water from the section to the south of the portal (5.6 ha) is considered potentially contaminated, as it flows past the waste pads. A series of ditches will direct the water to a holding pond (runoff collection pond “B”). The pond will have a bituminous membrane and a capacity of 3,088 m<sup>3</sup> of water.

Domestic wastewater will be collected by above-ground heated insulated conduits connected to all buildings with a water supply. An underground conduit directs the free-flowing wastewater at the building outlet to a series of three septic tanks that empty into the pumping station, which feeds the aboveground seepage bed.

The main source of contaminated water will come from the underground excavation work. Water produced during excavation and exploration activities will be directed to the underground settling ponds before being pumped to the surface through a six-inch conduit. Double conduits will be used to pipe the contaminated water from the portal to the treatment plant. The settling pond has a total capacity of 3,530 m<sup>3</sup>. Treatment consists of removing the solids suspended in the water from the ramp before they are chemically treated. Solids in the water will remain in the settling ponds. The contaminated water will then be chemically precipitated in a two-stage process to remove the contaminants (metals and radioisotopes) present. This treatment will involve the addition of barium chloride and ferric sulphate, as well as lime for pH control. The settling ponds permit final clarification of the water after it is chemically treated. The ponds are built with impermeable materials and can each hold a volume of 1,000 m<sup>3</sup> of water.

Water from the settling pond will be sampled and analyzed by the field laboratory. Control samples will be sent weekly to a certified laboratory. Depending on the results, the water will either be sent to the final discharge or returned to a previous treatment stage. The proponent plans to discharge the final effluent into Lake Matoush (Lake 5).

### **3.2.7 Waste management**

The underground exploration project will generate solid industrial and household waste that must be disposed of in accordance with the various regulations governing waste management. Non-radioactive and non-hazardous industrial waste will consist mainly of scrap metal, vehicle parts,

tires, wood, etc. There will also be household waste from the offices and camp (dormitories, washrooms, kitchen).

Most of the waste will be recycled onsite and any remaining waste that cannot be recycled or reused will be buried at a landfill in an isolated area (LETI) or stored in a container at the site before being delivered to the Chibougamau landfill as required. Recycled material is temporarily stored onsite before being collected by a transporter and taken to a sorting centre in Chibougamau.

In July 2007, the Government of Quebec issued the proponent a declaration of exemption from the environmental and social impact assessment and review procedure for waste landfill, valid for three years. The declaration of exemption was renewed in August 2010 to enable continued use of the LETI. The landfill is located 500 m southwest of the camp and about 175 m west of Lake Matoush. The LETI covers an area of about 850 m<sup>2</sup>, is 4 m deep and sits about 8 m above the water level of Lake Matoush. The landfill operates under provincial regulations. Burning is prohibited at the LETI, and the proponent plans to limit its use of the LETI as much as is economically feasible, using it only for non-recyclable kitchen and domestic waste.

A container will be made available to workers to dispose of non-hazardous, non-recyclable, non-radioactive, dry solid waste. The container will be taken to the Chibougamau landfill as required. The waste will consist primarily of plastic/waxed paper bags from the water treatment plant, non-recyclable wrapping material, etc.

Used oil and lubricants will be collected in dedicated plastic containers that will be distributed throughout the power plant and the vehicle and equipment maintenance sites. Used oil and lubricants will be reused onsite by a contractor as fuel for the furnaces (heating). Other waste generated during maintenance (oil filter, etc.) will be deposited in 200-L barrels. Once they are full, the barrels will be collected and treated by a certified transporter.

Absorbent pads and other materials used to clean up accidental spills will be contained in 200-L barrels. Contaminated soil and water will also be contained in barrels, quantities permitting. If the quantity of contaminated soil is large, the excavated material will be temporarily placed on a liner and covered with a second liner to prevent the contaminated soil from coming into contact with water. Contaminated soil and/or barrels will be stored at the LETI temporarily until a certified transport company can come to treat them in an authorized location.

Waste with radioactive readings of more than 0.4 Bq/cm<sup>2</sup> will be placed in an orange container, hermetically sealed, identified with the radiation warning symbol and stored on the special waste

pad until the underground work ends. The disposal of radioactive waste, if any, will depend on whether the project proceeds to a mining phase or is abandoned. In the first case scenario, the waste could be incorporated into the mining waste of the future mine. In the second, the waste (sludge, equipment, clothing, etc.) would be returned underground in a drift.

### **3.3 WORK SEQUENCE AND ECONOMIC ASPECTS**

If the proponent obtains all the necessary authorizations, the initial work will consist of excavating the portal (i.e., the first 30 m). The proponent will then mobilize contractors for the subsequent underground work and construction of the surface infrastructure. Upon completion of the surface infrastructure, activities will focus on developing the main underground access, installing the ventilation system, communication system, pumping system, settling pond, etc. In parallel with the advanced underground exploration program, the proponent will proceed with surface exploration work.

Construction and excavation of the underground ramp should be completed within a period of 18–24 months. An additional 12–18 months should be allocated for the underground exploration program. The exploration work schedule is directly dependent on the program results. Exploratory drilling activities will only start when the ventilation system is operational. In the event of final cessation of activities on the property after the exploration drilling results are received, remediation work will begin as soon as conditions allow. Approximately six months are planned for site remediation.

The proponent anticipates that the underground exploration work will cost \$60 million and that 180 direct jobs covering a period of 18–24 months will be created during ramp construction.

### **3.4 REDEVELOPMENT/REMEDIATION**

Government authorities asked the proponent to submit a site remediation plan. After consulting with the MDDEP, the MRNF accepted the plan in December 2008 and the financial guarantee required under the *Mining Act* was deposited. Because exploration phase activities were of a short duration, the MDDEP asked for a review of the remediation plan incorporating the latest available information. The plan must also meet the CNSC's regulatory requirements.

In the impact study, remediation work (in case of temporary or permanent closure) proposed by the proponent must be completed within six months and include the following:

- recovery, where economically reasonable, of mining and surface equipment, buildings, etc.
- complete removal and treatment of all chemicals, reagents, propane and petroleum products; these are to be placed (reused, recycled or otherwise) in authorized premises
- disposal of any material (equipment, materials, etc.) that has a higher radioactivity than the prescribed norms allowed in the underground development
- special waste stockpiled in dedicated areas during work will also be returned underground
- removal and disposal of geomembranes and underlying contaminated soils, if present; any contaminated geomembranes or soils to be placed in the underground development
- concrete floors and foundations to be inspected for traces of contamination and disposed of in the underground development or buried under the site, as the case may be
- unless otherwise specified, the airstrip, accesses and work areas to be levelled and revegetated
- household waste to be buried in the site's landfill, which will be covered and redeveloped as prescribed in the *Regulation Respecting the Landfilling and Incineration of Residual Materials*
- the drainage system and culverts to be removed to re-establish normal flow of the surface waters at the site
- revegetation of disturbed areas

The proponent defines temporary closure of the site as the cessation of work for 18 months or less.

### 3.5 ALTERNATIVE MEANS AND VARIATIONS

The directive requested from the proponent to consider alternative means of carrying out the project. This is also a requirement under the CEEA, which defines alternatives as functionally different ways of meeting the need for the project and achieving the project's purpose. In the impact study, the proponent states that there is no alternative site for the project, given the location of the deposit, the footprint of existing activities in the area and the location of the camp.

At the request of FRP-S, the proponent identified the following variations :

- 1) **Exploration methods** (drilling from surface or underground exploration ramp). The proponent considers that the localized effect of an underground exploration ramp will have fewer impacts on the environment and on the hydrogeology of the rock mass than a large number of scattered

holes drilled from the surface. In terms of engineering and given the depth of the mineralized zones (600–800 m), the proponent considers it necessary to excavate an underground exploration ramp in order to complete the drilling program.

- 2) **Underground exploration method** (inclined ramp or vertical shaft). Use of an inclined ramp is considered more economical, given the geometry of the mineralized zone. However, no costs, geotechnical constraints or volumes of excavated rock are defined for each option.
- 3) **Siting of portal and underground exploration ramp.** The proponent notes that optimal sites were selected for the portal and ramp, as the elevation of the local rock is well above the lake level, thus reducing potential water inflow. The portal's alignment is also related to the development of the planned exploration ramp.

### 3.6 OPINION OF PARTICIPANTS

Some participants (M02, M03, M04) questioned the justification or need for the project. In their opinion, economic projections for both uranium and uranium mining are overly optimistic. For example, MiningWatch Canada (M03, M04) argued that, contrary to the proponent's claim, demand for nuclear energy is plummeting, which suggests that the price of uranium is unlikely to reach levels at which the project would become viable. Other participants wondered whether the proponent could not simply work from the surface, rather than building a ramp.

Other participants (M01–M11) denounced the use of uranium in weapons or expressed the opinion that because viable alternatives to the use of uranium in the energy and biomedical sectors were available, the project was unjustified. For example, the submission from the Centre de santé et de services sociaux de Sept-Îles (CSSS Sept-Îles) (M11) referred to the use of cyclotrons or linear accelerators to produce useful isotopes. CSSS Sept-Îles, the Réseau québécois des groupes écologistes (M02), MiningWatch Canada (M03, M04) and the Mista-Cini Coalition (M09), along with other groups and individuals, also expressed the need for a moratorium on uranium exploration and mining in Quebec. In January 2011, the Cree Nation of Mistissini (M07) also demanded a moratorium, but only for the traditional lands of Mistissini. In March 2011, the GCC gave their support to the resolution of the Cree Nation of Mistissini.

The CRÉBJ (M10), on the other hand, believes that energy minerals offer a promising opportunity in terms of the regional development process and the region's position on the Plan Nord.

Finally, a number of the concerns and questions expressed in public hearings or in submissions by the participants on a variety of issues (mine waste management, contaminated water treatment, radiation protection, land occupancy, etc.) relate to a future mining phase and not to the current advanced exploration project (M03, M04, M06, M08, M11).

### 3.7 OPINION OF REVIEW PANEL

FRP-S notes that the Matoush project is not the only uranium exploration project in Quebec. Although it has examined the issue, FRP-S has no mandate to determine energy policy for Quebec or to assess the justification for the decision to proceed or not proceed with exploiting uranium deposits in Quebec. The FRP-S' mandate is to assess the submitted project, whose purpose relates to the preferred advanced exploration method for a potential deposit. FRP-S acknowledges, however, that the issue of nuclear energy should have been debated before holding public hearings on the advanced exploration project. With a strategic land development assessment, it might have been possible to compensate for the lack of regional land use planning and to take different values and interests into consideration.

**Recommendation 1: Given the concerns raised and the numerous potential debates over the development of a uranium mine in Quebec, FRP-S recommends that, if the Matoush project goes ahead after the advanced exploration phase, the federal government should, as permitted under the CEAA, submit the proposed mining project for review by a JBNQA-CEAA joint federal panel.<sup>3</sup> Given the specifics involved in coordinating environmental assessment processes on JBNQA territory, the make-up of this future joint panel should be predetermined. This recommendation does not prevent the authorities from deciding whether a moratorium on uranium development in Quebec should be declared.**

While finalizing this report, FRP-S received a resolution from the Cree Nation of Mistissini, supported by the GCC, calling for the suspension of uranium exploration and development on the community's traditional lands, so that the proponent could continue its environmental studies and information and communication activities with the Mistissini community and, eventually, negotiations on the socio-economic benefits of the project. This demand is examined in section 5 of this report and is taken into consideration in the final recommendation by FRP-S.

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<sup>3</sup> A review panel is a group of experts selected on the basis of their knowledge and expertise and appointed by the Minister of the Environment. The Minister also appoints one of the panel members as chairperson. A review panel is appointed to review and assess, in an impartial and objective manner, a project which could have adverse environmental effects. A review panel may also be appointed in cases where public concerns warrant it.

FRP-S was informed of another aspect at the tail end of the process, this time by the CNSC. In April 2011, the CNSC informed FRP-S that the proponent had submitted a variation concerning the location of the final effluent; it would be discharged into a stream southwest of the main camp, instead of into Lake Matoush. However, FRP-S cannot judge the effects of this variation, since new analyses are required. The need for additional information from the proponent is covered in section 6.3.4.

Given the nature of the project, FRP-S is unable to determine whether the exploration method proposed by the proponent is essential; because the advanced exploration activities are needed to determine the concentration, volume and continuity of the deposit more reliably and accurately, FRP-S can only note that the proponent states there are no alternatives to the project.

In technical terms, however, FRP-S accepts the proponent's argument that construction of an underground exploration ramp may be necessary (e.g., to conduct *in situ* geotechnical measurements or to carry on drilling activities at depths of 600–800 m). In the opinion of FRP-S, and returning to one of the concerns raised by MiningWatch Canada, it is still not clear whether construction of the underground ramp would have fewer environmental effects than drilling from the surface, as Strateco Resources has done at the site since 2006. The exploration ramp would necessitate the installation and management of major water treatment and waste storage infrastructure, which would not be required if drilling from the surface. In the view of FRP-S, the decision to proceed with construction of an underground ramp should have been supported by a more comprehensive, more rigorous argument by the proponent to establish the environmental, technical and economic criteria marshalled in support of its choice.

FRP-S notes that some project details (e.g., work variations or the identity of contractors to work at the site) are not yet known. Still, while it regrets the lack of detail provided on the variations examined by the proponent regarding access roads, surface facilities and other components relating to the exploration work, FRP-S is satisfied that the options presented by the proponent concerning the repair of existing roads, rather than the construction of new ones, and the options to maximize the use of borrow pits already in operation are acceptable. On this point, FRP-S notes that on March 31, 2011, Strateco withdrew its application for a licence to do repair work on the old winter road to the Eastmain mine, in light of progress on the provincial Route 167-N extension project by the ministère des Transports du Québec.

Finally, FRP-S is satisfied that the proponent has submitted a site remediation plan in the early stages of the process, as required under the CNSC licensing procedure.

## 4 SCOPE OF ENVIRONMENTAL ASSESSMENT

### 4.1 SCOPE OF PROJECT

In July 2010, in the wake of the January 21, 2010 decision of the Supreme Court of Canada in *MiningWatch Canada v. Canada (Fisheries and Oceans Canada)*, the CNSC updated the scope of the project submitted for review in order to include all activities relating to the development of the exploration ramp, such as the new borrow pits and temporary stockpiling of contaminated soil (Appendix 3). The scope of the project therefore covers construction of an underground exploration ramp 2,405 m long and 300 m deep, as well as the construction, operation or repair of the following components:

- reconstruction of the access road over a distance of 10 km—currently a winter road—connecting the Matoush site with the future permanent road (extension of Route 167-N by MTQ)
- waste rock storage and management
- contaminated water treatment and disposal infrastructure (ponds, plant, etc.)
- temporary storage facilities for contaminated soil
- underground exploration work
- borrow pit operations
- any other work or activity potentially affecting one or more of the components listed in Table 4.1 below

On August 20, 2010, in response to an application by the the Agency (Appendix 5), the proponent submitted additional information to FRP-S on the access road to the site, temporary storage facilities for contaminated soil and borrow pit operations.

### 4.2 ELEMENTS FOR REVIEW

This section describes the key elements that FRP-S must take into account in its analysis of the project in terms of the application of the environmental assessment processes under the JBNQA and the CEAA.



#### **4.2.1 Guiding principles under JBNQA section 22**

The responsible governments and agencies created in virtue of section 22 shall, within the limits of their respective jurisdictions or functions as the case may be, give due consideration to the following guiding principles (section 22.2.4):

- protection of the hunting, fishing and trapping rights of Native people in the Territory, and their other rights in Category I lands, with respect to developmental activity affecting the Territory
- the environmental and social protection regime with respect to minimizing the impacts on Native people by developmental activity affecting the Territory
- protection of Native people, societies, communities, economies, with respect to developmental activity affecting the Territory
- protection of wildlife resources, physical and biological environment, and ecological systems in the Territory with respect to developmental activity affecting the Territory
- the rights and guarantees of the Native people within Category II lands established by and in accordance with section 24 until such land is developed
- involvement of the Cree people in the application of this regime
- the rights and interests of non-Native people, whatever they may be
- the right to develop by persons acting lawfully in the Territory
- the minimizing of adverse environmental and social impacts of development on Native people and on Native communities by reasonable means, with special reference to those measures proposed or recommended by the impact assessment and review procedure

#### **4.2.2 Elements of environmental assessment under the CEAA**

In an environmental assessment, the following factors listed in section 16(1)(a) through (e) and 16(2) of the CEAA must be reviewed:

- the environmental effects of the project, including malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are 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 in the preceding point
- comments received from the public and from Aboriginal people in the matter
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project

- the project rationale
- alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means
- the need for, and the requirements of, any follow-up program in respect of the project
- the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and the future

Environmental effects are defined in section 2(1) as any change that the project may cause in the environment—including any change that it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as defined in section 2(1) of the *Species at Risk Act*—any effect of any such change on health and socio-economic conditions, the current use of lands and resources for traditional purposes by Aboriginal persons; 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.

#### 4.2.3 Summary of environmental and social components

Table 4.1 lists the components selected for this review. For a more detailed description of the scope, please refer to Appendix 2 containing the Federal Administrator’s directive.

**Table 4.1 Summary of environmental and social factors**

	Subject	Effects for Review
Physical environment	Aquatic environment	<ul style="list-style-type: none"> <li>• permanent or temporary alterations in the aquatic environment</li> <li>• quality of water bodies receiving any effluent</li> <li>• radioactive contaminants liable to be released into the aquatic environment; possible alteration in the local hydrology (surface and groundwater) caused by dewatering and the keeping dry of the ramp and underground facilities</li> </ul>
	Air and soil quality	<ul style="list-style-type: none"> <li>• drainage and erosion from wind or runoff</li> <li>• increase in dust emission from ground transportation</li> <li>• radioactive contaminants liable to be emitted into the atmosphere</li> </ul>
Biological environment	Terrestrial and aquatic vegetation	<ul style="list-style-type: none"> <li>• fragile or exceptional plant communities and rare, threatened or endangered species liable to be affected by the project</li> </ul>

	Subject	Effects for Review
	<p>Wildlife species at risk or having special status and their habitat</p> <p>Terrestrial wildlife and habitat</p> <p>Migratory birds</p> <p>Fish and fish habitat</p>	<ul style="list-style-type: none"> <li>• maintenance of fish populations and habitat, taking into account possible chemical and radiological toxicity of effluent and the life cycle of the species concerned</li> <li>• free movement of fish</li> <li>• effects on the aquatic or terrestrial environment of an accidental hazardous spill</li> <li>• survival and movement of terrestrial wildlife and bird life as well as the loss of preferred habitat or possible destruction of rare, threatened or endangered species, taking into account precedents set by uranium mines</li> <li>• effects on the population dynamics and behaviour of wildlife and impacts of environmental toxicity on wildlife and wildlife habitat</li> </ul>
Human environment	Human health	<ul style="list-style-type: none"> <li>• effects of contaminants (radioactive and metals) in traditional food, water and air</li> <li>• radiation doses likely to be received by the exposed population, including workers, as a result of the project</li> <li>• proposed mitigation measures</li> <li>• environmental impacts of an accidental radioactive or chemical spill</li> </ul>
	Quality of life and culture	<ul style="list-style-type: none"> <li>• disturbances caused by noise, dust, etc.</li> <li>• effects of lengthy absences on Cree workers' family life</li> <li>• Cree perception and fears with regard to possible environmental contamination (radioactive or other), in particular from deposition of dust in water bodies from ground transportation</li> </ul>
	Economic benefits	<ul style="list-style-type: none"> <li>• for each project phase, the number and type of temporary and permanent jobs created for Cree and non-Aboriginal people</li> <li>• availability of skilled labour or workers who can be trained, taking into consideration the subsequent phases of the uranium project as well as other mining projects in the same area, whether ongoing or foreseen</li> <li>• nature of training programs</li> <li>• contracts with Cree people and companies</li> <li>• predicted short- and long-term economic benefits for local companies</li> <li>• job or economic losses for local companies whose activities would be affected by the present project</li> <li>• development prospects in related sectors for local or regional communities</li> <li>• development prospects for recreational-tourism products for this region and surrounding areas as well as the potential positive or adverse impacts of the present development project on future development in this activity sector</li> </ul>

	Subject	Effects for Review
	Land use	<ul style="list-style-type: none"> <li>• impact of infrastructure on Cree land use and traditional travel routes, particularly on the project site</li> <li>• changes to traditional hunting and fishing activities in the study area</li> <li>• wildlife use by sport hunters and fishermen</li> <li>• protected areas (future ATO Park)</li> </ul>
	Heritage and archaeology	<ul style="list-style-type: none"> <li>• impact on prehistoric, historic and spiritual sites in the study area, as well as sites of special interest, such as burial grounds and sacred or favoured sites</li> </ul>

#### 4.3 OPINION OF PARTICIPANTS

The Canadian Parks and Wilderness Society – Quebec Chapter (CPAWS) (M05) believes that the proponent is downplaying the geographic scope of the project by failing to consider the number of related projects not subject to environmental assessment. MiningWatch Canada (M03, M04) also regrets the fact that the airstrip was built without first conducting an impact assessment. To remedy this omission, the organization would like that infrastructure to, at the very least, be included in the assessment of cumulative effects.

#### 4.4 OPINION OF REVIEW PANEL

FRP-S notes the confusion that reigned throughout the review process concerning the Route 167-N extension project. Strateco initially applied for permission to turn the former winter road to the Eastmain mine into an all-season road. Since the MTQ was planning an all-season road along a near-identical route, Strateco first withdrew the application, then renewed it and subsequently re-withdrew it in March 2011.

Although some of the related components were not within its mandate, FRP-S concurs with some participants, like CPAWS, which noted that the Matoush project will, in fact, have a larger geographic footprint than predicted in the impact study, especially with respect to structures already in place (e.g., airstrip, onsite access roads, landfill site, etc.).

## 5 PUBLIC PARTICIPATION

### 5.1 INFORMATION AND CONSULTATION ACTIVITIES BY PROPONENT

#### *Communication plan*

In its impact study, Strateco Resources stated that it was “aware that the information given to the target public is among the essential conditions for success of the Matoush project”. On this point, the proponent stated that it had made the necessary arrangements before filing the impact study in October 2009 “so that all the work and activities realized in the context of the project are open and transparent processes”, adding that it had a communication plan that “primarily aims to establish and maintain good relations and open and continual communication with the Cree community of Mistissini and the citizens of Chibougamau”. Strateco listed the following specific communication objectives:

- present the Matoush project and expose its principal elements
- demystify uranium, its exploration and its extraction
- inform the target public of the possible impacts of the Matoush project
- offer continuing updates concerning the main developments of the project
- explain how the public can participate and influence the decision process
- stimulate discussions to inquire about public concerns
- maintain constant communication with the public

Finally, Strateco Resources noted that “the communication plan objectives have helped to determine the principal questions to discuss and the communication methods to favour with the target public. Strateco has chosen to give particular but not exclusive attention to the description of the different project phases, to the design, schedule and economic portrait of the project, and to health and safety, the environment and to uranium and its transportation”.

#### *Initial contacts*

The proponent noted that, following the acquisition of the Matoush property in 2006, it had formally contacted the Cree Nation of Mistissini. Meetings were subsequently held with the Chief and with the Coonishish family, which owns trap lot M-17C. Finally, meetings were held with technical staff of the GCC of Quebec.

Meetings were subsequently held in 2007 in Chibougamau with residents and town officials. Early in 2008, individual meetings were held with the tallymen for the traplines adjacent to the project site and with representatives of families using these lands.

#### *Pre-consultation activities*

In late 2008, after accepting the recommendation of its geological consultant to carry out an advanced exploration project, the proponent explained that it had moved on to a second stage in its communication plan. It wanted to meet with the communities concerned in order to better inform them of its proposal to carry out advanced exploration and hear their concerns. According to the reports produced during this stage, “the term ‘pre-consultation’ is distinguished from the ‘consultation’ activities that will be organized as part of the formal consultation process with the government after the social and environmental impact study has been submitted”. Also, “the information collected during those activities will be taken into consideration by the project team in order to identify and minimize impacts and increase benefits. The proponent will follow up with the participants, as required”. Finally, it was noted that a key purpose of pre-consultation activities was to identify issues of major environmental and social significance, valued environmental and social factors, and issues and concerns that would have to be dealt with at a later date.

As part of the pre-consultation phase, Strateco organized an "open-door" meeting in Mistissini on December 9, 2008. Some 30 participants attended the meeting to obtain information about the project. They were also invited to express any concerns relating to the advanced exploration project and the extension of Route 167-N, which was part of the proponent's project at the time. They were also asked for suggestions about what could be done to protect the locations under consideration for the project, “as they are highly valued by trappers and their families”. According to the proponent, in the course of discussion, participants raised questions about training, jobs, business opportunities and the potential economic boost to the community. The participants were also interested in the project's technical aspects, schedule and costs. Questions about health, safety and the environment were also raised.

On the afternoon of December 9 and morning of December 10, three workshops were also held—the first with the tallymen and a number of land users (hunters and trappers) and the second with some 30 elders. The third workshop was geared toward those concerned with youth, education, health and social services. It appeared from the report on the first two workshops that participants raised questions similar to those raised in the open-door meeting. Participants in both workshops were interested in the extension of Route 167-N. According to some, the route should be viewed as a development road and not as an improvement to the existing winter road. Therefore, special

attention should be paid to consulting with Cree hunters and trappers. Based on the report on the third workshop, questions were raised about ore transportation and the possibility of contaminants from the project migrating to the rivers.

Meetings were also held in Chibougamau. The open-door meeting held on the evening of December 11, 2008, attracted about 50 participants whose questions related to business opportunities, the project's technical design, the extension of Route 167-N and health and safety in uranium mines. One afternoon workshop was held. According to the report, “this workshop was intended for the community’s economic stakeholders”. A total of 16 persons attended and talked with Strateco Resources about the project's economic and environmental aspects, as well as the road extension.

When the three pre-consultation days had finished, other activities were organized at the Matoush camp in February 2009, in particular with tallymen and families potentially affected by the project.

#### *Strateco's website*

In addition to the meetings mentioned above, the company noted in its impact study the addition of a new section to its website so that communities could access local-interest news online.

#### *Other community relations activities by Strateco*

In the information session held by FRP-S and COMEX on May 25, 2010, the proponent announced the addition to its team of a director of community relations and of an officer responsible for relations with the Mistissini community. It also announced that it had opened an office in Chibougamau and another in Mistissini. Moreover, the proponent explained that it intended to continue its two-year effort to form an advisory committee in Mistissini with a mandate to “discuss training, jobs, creation of businesses, support for businesses...and financial compensation...when the mine would be started up”. Among the additional information supplied to FRP-S in August 2010, the proponent explained that, although the initial demand for the committee came from Mistissini's residents, its composition had not yet been finalized.

Also in August 2010, in response to the FRP-S, which had questions about consultation activities in general, Strateco Resources provided a list of its communications with the Cree Nation, the communities of Chibougamau and Chapais and other organizations, stating the nature of the activity, the persons contacted, dates and locations. The list shows that between April and December 2010, the proponent held about 125 individual meetings with Mistissini members. However, no details are provided on the purpose and results of the meetings.

### *Information brochure and fact sheets*

In January 2010, Strateco Resources published a bilingual brochure entitled *Uranium. The Facts*, covering uranium's uses, global supply and demand, its benefits, and a number of concerns such as occupational safety, transportation safety and how nuclear reactors work. The brochure also makes the point that uranium and its uses are issues that arouse opposition within societies.

The proponent added that, in response to concerns expressed by the communities and in order to reach the broad public with its information, it had published six uranium fact sheets in two publications, *La Sentinelle* (newspaper) and *The Nation* (magazine), in the first part of 2010. The fact sheets discussed radon, environmental impacts, site safety, peaceful uses of uranium, transportation and site remediation. The proponent also expressed its willingness to carry on with this type of published material, as required.

## **5.2 CONSULTATIONS BY THE CANADIAN NUCLEAR SAFETY COMMISSION**

CNSC representatives participated in three public information sessions in Mistissini (September 24 and October 20, 2009 and September 8, 2010), plus a radio program on September 7, to inform the community about the regulatory framework for uranium exploration and mining. The record of the meeting of September 24, 2009 (prepared by the CNSC) noted that some 50–60 people attended and a large number of topics were covered. Minutes of the other two meetings are unavailable.

After the amendments to the CEAA entered into force on July 12, 2010, the CNSC, as the responsible authority, gave formal notice providing the public with an opportunity to comment on the project and the conduct of the comprehensive study, pursuant to amended section 21.1(1). The CNSC informed FRP-S that it had not received any comment on the subjects.

## **5.3 CONSULTATIONS BY FEDERAL REVIEW PANEL SOUTH**

Under its review mandate, FRP-S performed various public information and consultation activities on the project.



### *Access to information*

In September 2009, the The Agency added to its website (<http://www.acee-ceaa.gc.ca/default.asp?lang=En&n=1ED9DF1A-1>) a special heading for projects launched in JBNQA territory to provide public access to information concerning the Matoush project. As new information became available, FRP-S posted it online. Documents from the Federal Administrator, press releases and public notices from the review committees, documents from the proponent, FRP-S and public sessions, and other documents held by FRP-S were gradually added to this digital record. With a few exceptions, all the documents archived on this site are available in both English and French.

The site also gives the names and coordinates of resource persons for anyone interested in obtaining details on the archived information. The resource persons are officials with FRP-S, the CNSC and the The Agency.

In November 2009, COMEX and FRP-S issued a joint public notice inviting the population to consult the impact study filed that same month by Strateco. The notice stated that the study was available on the website but also in print form in the Chibougamau library, Mistissini's local government office and the The Agency's Quebec City office.

To help the Cree understand the scientific and technical terms used in the Matoush project, FRP-S asked the The Agency and the Cree regional government to produce a glossary. This document, prepared in consultation with the CNSC and FRP-S, offers simplified definitions of some 70 concepts in both English and Cree. The glossary was placed online and is also available for consultation in the three locations mentioned above and in the consultation sessions hosted by the two review committees. A pamphlet containing information on the review process and participating committees was also developed by FRP-S and distributed during phase II of the consultations.

### *Information sessions (Phase I consultations)*

During the project review process, FRP-S and COMEX held two joint information sessions—one in Mistissini on May 25 and the other in Chibougamau on May 26, 2010. Their purpose was to provide information on the project and its review process. In each session, the proponent introduced its project and the key elements of the environmental impact study it had presented. Next, the CNSC explained its dual role as both the responsible authority as defined in the CEAA and as the regulatory agency for uranium mines. Health Canada also explained its role as an expert department. Finally, the chairs of COMEX and FRP-S provided information on the review process

with which they were charged. The participants were then invited to put their questions to the proponent, panels and federal agencies present. The agenda for those meetings is provided in Appendix 6.

In the weeks prior to the consultations, invitations to attend the sessions were posted in public locations and announced by local radio stations. Some 100 people attended the session in Mistissini, while about 50 attended the session in Chibougamau.

The Mistissini session was conducted primarily in English, with simultaneous translation available in Cree and French. The entire session was also broadcast live over local radio. All interventions were recorded, and full transcripts in English and French were produced and posted on the The Agency's website.

The Chibougamau session was conducted primarily in French. A translation service was available, and full transcripts in English and French were also posted online. A participant recorded most of the session and posted the video online. Different segments of the session may be viewed on the Internet at [www.youtube.com](http://www.youtube.com).

#### *Public hearings (Phase II consultations)*

Public hearings were held jointly by COMEX and FRP-S on November 23 and 25, 2010. Roughly 300 people attended the November 23 hearing in Mistissini, while 75 attended the November 25 hearing in Chibougamau. The purpose of the hearings was to gather public opinion on whether or not the project should be licensed and, where applicable, on measures to be taken if the project is licensed. The hearings were preceded by public notices disseminated in the region and on the CNW-Telbec wire service.

A simultaneous translation system was available at each hearing, and audio web broadcasts of the hearings were available on the The Agency's website. A telephone line was also installed at the request of a Sept-Îles organization that wished to participate.

A total of 12 submissions were filed and a few participants made oral interventions. The proceedings of each session and the order in which the interventions were presented are found in Appendix 6.

## 5.4 OTHER CONSULTATIONS

Upon completion of Phase I of the public hearings held by COMEX and FRP-S, the local environmental authority for the Cree Nation of Mistissini organized three workshops on the project with local stakeholders in May 2010. The purpose of the workshops was to provide details on the project and its impacts, and to identify concerns by the public in preparation for the Phase II hearings. Topics included—but were not limited to—the following: possible irreversible effects on the environment; pollution of rivers; waste management; effluent treatment; spread of radioactive dust; effects on wildlife; storage of radioactive waste; emergency measures plan; ore transport; radon; background on the effects of uranium mining; worker protection; cumulative effects; financial safeguards; job opportunities for the Cree; Cree involvement in environmental monitoring; and recourse to traditional knowledge in preparing the impact study.

The Cree Nation of Mistissini also conducted a survey of 600 community members in January 2011 to get a better idea of their opinions on the project. The survey led to a March 2011 Council resolution supporting the demand for a moratorium on uranium exploration and mining on traditional Mistissini lands.

On October 29, 2010, the Association des employés du Nord québécois, which represents approximately 1,500 teachers and support staff working in Kativik's school boards, came out 85% in opposition to uranium exploration and mining in response to a survey of all its members.

The CRÉBJ also took a regional initiative to define the uranium issue and disseminate that information among the communities. With the support of consultants, meetings were held in October and February 2010 in Chapais and Chibougamau with target groups (elected municipal, provincial and federal officials and their representatives, people from various regional units, and people representing civil society, public health organizations and the regional CSSS). Public meetings were held in the Cree community of Mistissini in October 2009 (in collaboration with then Chief, John Longchap) and in Chapais and Chibougamau in May 2010. In collaboration with the Cree community of Mistissini, the CRÉBJ also extended invitations to Aboriginal chiefs of Saskatchewan communities located near uranium mines currently in operation to attend the March 2010 meetings in Chibougamau and Mistissini.

## 5.5 SUMMARY OF CONCERNS RAISED IN PUBLIC HEARINGS

The main concerns raised in the joint public hearings by COMEX/FRP-S, held on November 23 and 25, 2010, may be summarized as follows:<sup>4</sup>

### Purpose/justification of project

Certain participants (M03, M04, M09) questioned the relevance of and need for the project. In their opinion, economic projections for uranium and uranium mining are highly optimistic. Other participants felt that the existence of viable alternatives to the use of uranium in the energy and biomedical sectors meant that the project was not justified.

### Noncompliance of impact study

A number of participants (M03, M04, M06, M07, M09, M11) believe that the environmental impact study does not follow the directive, and note the proponent's failure to respond to a number of requests for further information from FRP-S. Comments on the impact study's noncompliance relate specifically to the lack of baseline information on the environment and land occupancy by the Cree, the limited analysis of the project's cumulative effects and the impacts associated with a future mining phase.

### Waste management and risk of contamination

Some participants (M01, M02, M08, M11) stressed the long-term health and environmental risks associated with waste. Waste management following the closure of the advanced exploration site or of a future mine also appears to be a serious concern.

### Information and consultation with the Cree Nation

The Council of the Cree Nation of Mistissini formally rejected the project. In its brief (M07), the Council explained that its decision was based primarily on breach of trust between the proponent and the community. In the Council's opinion, this situation could initially be attributed to the proponent's approach to community information and consultation. The Council also believes that Strateco's consultation was inadequate given the level of concern expressed in Mistissini about the project and its impacts. The absence of any community engagement mechanisms (e.g., advisory committee) and lack of preliminary information on consultation procedures were also mentioned. Finally, the Council was disappointed that no post-consultation feedback was given on how the concerns and values expressed by the Cree would be taken into account in the project design and mitigation measures.

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<sup>4</sup> A number of the concerns summarized here are covered in sections 6–11 of this report.

### Water issues

Some participants (M01, M02, M05, M06) expressed concern about the project's presence on "Quebec's watersheds" and its potential impacts on surface water, since the latter is the only component for which a potential major impact was identified by the proponent. Also, some participants (M03, M04, M05) signalled the lack of basic hydrogeological information as a major omission.

The treatment of contaminated water, specifically the management of sludge from the water treatment ponds, seasonal estimates of discharges into the receiving lake (possibility of spring shock when the ice melts, weather considerations, etc.), and effluent monitoring also emerged as serious concerns among the participants (M03, M04, M05, M06).

### Health risks to workers and the public

A number of participants (V01, M06, M09), including members of the Mistissini community, expressed concern about the project's impacts on public health and the health of workers. Some argued that the proponent's analysis should have included the subsequent mining phase (V01, M06, M08).

Some intervenors specifically questioned the proponent's choices in its human health risk analysis: the definition of recipient groups, the selection of contaminants of potential concern (COPC) and the health risks associated with the traditional Cree diet were among the aspects criticized (M06, M07, M08, M11).

Emergency measures in case of a workplace accident, forest fire or accidental spill were also concerns, given the site's remoteness from the resources that would have to be mobilized in case of such an event (M05, M06, M08).

### Socio-economic impacts of project

Several participants (V01, V02, M05, M06, M07, M08, M10) requested details on how the proponent planned to fulfil its objectives in terms of employment, training and economic benefits, specifically for the Cree of Mistissini. The CRÉBJ recommended that a committee with an obligation to produce results be formed to optimize economic benefits.

### Regulatory framework

While some participants expressed their belief that the legal and regulatory framework for this type of project was thorough and adequate (M08, M10), others demanded a moratorium on the uranium industry. Some of the latter group felt that a moratorium is necessary because of the risks

associated with the industry as well as doubts about the its advantages and disadvantages (M05, M09, M11). For others, the current challenge to the industry in Quebec is sufficient to justify a strategic environmental assessment or a social discussion involving broad consultations on uranium exploration and mining (M02, M03, M04).

#### Planned Albanel-Témiscamie-Otish Park

The project's proximity to the future ATO Park<sup>5</sup> concerns a number of intervenors (M02, M05, M06). Some fear that the development of the mining industry nearby will affect the integrity of its ecosystems. Others point out that little attention was paid to the park project in the impact study and, specifically, that potential adverse impacts of the Matoush project on the socio-economic benefits of the future park were not discussed.

#### Concept of land

Being a part of the land and its traditional form of stewardship were mentioned several times by the Cree participants (V01, V03, M07). Some felt that the project would, by its very nature, conflict with their values, which are based on respect for the land (V03, M07).

#### Potential project

The CRÉBJ (M10) was in favour of the project, subject to the Cree Nation of Mistissini also supporting it. For the CRÉBJ, the project's rigorous regulatory framework, the quality of the environmental impact study and the project's potential contribution to the regional economy are factors in the CRÉBJ supporting the project.

## **5.6 OPINION OF REVIEW PANEL**

The interventions from the November 2010 hearings were reviewed by FRP-S. While sections 6–11 below cover this material, two points should be dealt with in this section: (1) relations between Strateco and the community of Mistissini; and (2) the divergent positions of the Mistissini Council and the CRÉBJ.

#### *Relations between the proponent and the community of Mistissini*

Clearly, this project does not enjoy the support of the Council of the Cree Nation of Mistissini, which believes that the proponent has not succeeded in establishing and maintaining constructive dialogue

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<sup>5</sup> In partnership with the Cree Nation of Mistissini, the Government of Quebec has proposed the creation of the Albanel-Témiscamie-Otish Park, which will focus on the natural, cultural and historical heritage of an area covering more than 11,000 km<sup>2</sup>. It will be the first inhabited park in Quebec, as several families from the Cree community of Mistissini live within the park's proposed boundaries.

with the different groups within the community. Strateco's response to this statement was first surprise at the Council's position<sup>6</sup> and then doubt as to the Council's ability to convey its members' views accurately.<sup>7</sup>

FRP-S is of the view that the resolution rejecting the project, passed by the Council of the Cree Nation of Mistissini, and the resolution by the GCC on March 31, 2011 supporting the demand for a moratorium by the Cree Nation of Mistissini on any uranium exploration or mining project on the community's traditional lands must be taken into account in this report. The Council is the formal organization that represents the community. Moreover, as was mentioned in section 2, the environmental and social protection regime set out in section 22 of the JBNQA expresses the importance of ensuring that the guiding principles for the protection of the Cree, their communities, their land and their lifestyle are applied.

From a reading of its brief, it is clear that the Council of the Cree Nation of Mistissini regrets the proponent's failure to respond concretely to the concerns expressed by members of the community. Moreover, the Council believes that the community lacks information to make a decision on such development. In summary, the Council states that the level of social acceptability enjoyed by the project within the community is insufficient at this time. In its impact study, Strateco expressed more than once its intention to include in its project a number of factors influencing the ecosystems, resources and quality of life of individuals and communities, in order to ensure that the company plays an active role in environmental protection while promoting the project's social acceptability and harmonious integration within the community.

Therefore, FRP-S is not convinced that the project enjoys social acceptance in Mistissini. After reading various documents brought to its attention, FRP-S notes that since the November 23, 2010 session held in Mistissini, the gap between the position of the Mistissini council and that of the proponent appears to have widened.

In light of the principles set out in section 22 of the JBNQA and in light of the importance of establishing relations characterized by mutual respect between the parties, FRP-S recommends that the proponent resume discussions with the Mistissini Council by offering to enter into an impacts and benefits agreement (IBA) with the Council in the current exploration phase, for example. In the additional information provided to FRP-S in August 2010, Strateco Resources indicated that it had examined a number of agreements between Canada's Aboriginal communities and mining companies with projects already in the mining phase. The company also stated that it hoped to be able to benefit from those experiences when its project reached the mining phase.

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<sup>6</sup> Public hearings, phase II.

<sup>7</sup> Letter from the president of Strateco Resources to the review committee chairs, dated January 17, 2011.

Since the relationship between Strateco and the Mistissini Council appears to have broken down, the proponent might also find it helpful to review its communication plan and objectives with respect to the different stakeholders and adjust its approach accordingly. FRP-S believes that, where dialogue is possible, Strateco should focus on common values uniting it with the community.

**Recommendation 2: In the opinion of FRP-S, Strateco should assess the Council's receptiveness to negotiating an IBA in the current advanced exploration phase. If such an agreement appears possible, FRP-S recommends that the parties include the principles governing such an agreement in the context of an eventual mining phase. The proponent should report to the Federal Administrator on its activities toward this end.**

**Recommendation 3: FRP-S recommends that Strateco review its communication plan to initially reduce the gap between it and the community and to subsequently build a relationship marked by mutual trust between the parties.**

*Difference of opinion between the Council of the Cree Nation of Mistissini and the CRÉBJ*

The CRÉBJ describes itself as a “collaborative and planning authority comprising elected municipal officials and representatives of civil society and non-urbanized territory whose mandate is to promote and support economic, social and cultural development in Jamésie through cooperation among the various political, economic and social leaders in the territory” (M10). Yet FRP-S notes the absence of formal relations between the CRÉBJ and Cree organizations and, in particular, the councils of Aboriginal nations within the territory. Of course, the elected officials of each group assert that their informal ties allow them to exchange views and sometimes reach a consensus on proposals of a regional nature. Yet in the context of the project under review, there is no expression of regional collaboration.

In the hearings, the CRÉBJ and the Council of the Cree Nation of Mistissini expressed different positions. FRP-S observed that the Mistissini and Chibougamau communities enjoy positive relations; however, given the respective positions taken by the CRÉBJ and the Council, this difference could lead to a polarization that would compromise the positive relationship. For FRP-S, it would appear to be in the interest of both organizations to seek collaboration and consensus on the project. Moreover, as a number of projects and proposals are planned for the region, their collaboration should also extend to the future of this shared space. The regional integrated resource and territorial development plan adopted by the CRÉBJ in 2010 reiterates this need in its statement



that “despite the social and cultural characteristics that separate the two groups, some of the dominant features of the region create an opportunity to share a common reality and ensure social solidarity”. In the November 25, 2010 hearings, the CRÉBJ clearly expressed solidarity when it asserted that the consent of the Mistissini community was essential to the project.<sup>8</sup>

## 6 ANALYSIS OF PROJECT’S ENVIRONMENTAL AND SOCIAL IMPACTS

This section covers the method used by the proponent to assess the impacts of its project. Separate subsections are devoted to the various environmental and social factors that were assessed.

In each section, a summary of the proponent’s analyses is followed by participants’ comments and the findings of FRP-S concerning the project’s impacts and appropriate mitigation measures.

### 6.1 BRIEF DESCRIPTION OF ENVIRONMENT

The Matoush project is located in the Otish Mountains region northeast of Mistissini (210 km) and Chibougamau (275 km) in the Lakes Alabiel, Mistassini and Waconichi Wildlife Reserve 10 km from the planned ATO Park.

The region where the work is planned is in taiga and is characterized by a well-developed drainage system of black spruce with moss and lichen, as well as wildlife of relatively low diversity and abundance.

The surrounding area was the site of mineral exploration activity during the 1960s and is still used by the Cree community of Mistissini for traditional hunting, fishing and trapping activities.

Additional details on the physical and human environment are provided below in the subsections entitled “Current conditions.” For more information on available data, the reader may refer to the documents filed by the proponent in the project review:

<http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=FE6E7984-1default.asp?lang=En&n=FE6E7984-1>

The study zone in the proponent’s analysis was defined to take into account the extent of anticipated effects on the physical, biological and human environments. The study zone can vary

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<sup>8</sup> Transcript, November 25, 2011, pp. 57–58

from one component to another. For example, the local study zone for wildlife centres on the project site and covers about 65 km<sup>2</sup>. The regional study zone is located within a radius of about 20 km of the project site. For cumulative effects, the proponent identified projects for consideration within a 100-km radius of the site. As a general rule, the study zone is centred on the project with a radius ranging from 2 km for the local study zone to 20 km for the regional study zone.

## **6.2 APPROACHES AND METHODS USED IN ENVIRONMENTAL IMPACT STUDY**

The following assessment procedure was applied by the proponent for each component analysed:

- baseline condition of the component; i.e., environmental conditions prior to development
- environmental and social impact assessment, taking into account the implementation of mitigation measures
- recommendation for mitigation, monitoring or follow-up measures

To identify and assess the impacts of its project on the environment, the proponent conducted a causal analysis by combining impact sources, based on the technical characteristics of the project, and the environmental components. The proponent also stated that it had taken into account its consultations with neighbouring communities. Note that the construction, exploration and remediation stages were combined, owing to the project's short duration.

For this environmental assessment, the proponent had to consider the components of the physical, biological and human environments likely to be impacted, mentioned in section 4. Ultimately, the recommendation by FRP-S and the decisions by the authorities will be influenced by the significance of those impacts, once possible mitigation measures have been taken into account.

### **6.2.1 Identification of sources of impact**

The following potential impact sources were selected by the proponent:

- tree clearing and site preparation
- ramp excavation and waste rock management
- construction of facilities
- circulation of vehicles and equipment
- waste management
- storage and use of hazardous materials
- treatment of contaminated water and discharge of effluent

- remediation work
- dismantling of equipment and final closure
- workers, contractors, procurement
- atmospheric emissions

### **6.2.2 Criteria for determining significance of impacts**

Impacts were defined by the proponent as positive or negative, temporary or permanent. The significance of an impact was a function of its geographic extent, magnitude and duration. In the process of assessing the impact of its project, the proponent also considered the value (ecosystem-related and social) of the environmental components.

The environmental assessment method used by the proponent considers each environmental component and incorporates the concept of ecosystem-based value. According to the proponent, the ecosystem-based value of a component represents the relative significance of the component in relation to its role and function and takes into account the notions of representativeness, use, diversity, rarity and uniqueness. The socio-economic value of a component corresponds to its relative significance as attributed by the population, government agencies, special-interest groups, managers and experts. It refers to the desire or political will to maintain the integrity or original character of the component. Some of those values were established by consultation with Mistissini community members.

#### *Impact assessment criteria*

##### 1) Magnitude of impact

This refers to the degree of disturbance that affects the productivity of a habitat, species or community and the component's assigned ecosystem or socio-economic value. The proponent defines three levels of magnitude:

- High: the impact changes the component's integrity or strongly and irreversibly modifies the component or its use.
- Moderate: the impact causes a detectable change in the component's attributes or use without affecting its integrity.
- Low: the impact causes a slight detectable change in the component's attributes, use or integrity.

## 2) Geographic extent of impact

This expresses the range or spatial zone and the portion of the population (human, animal or plant) impacted. The extent may be:

- Regional: the disturbance is felt throughout the study zone or affects a limited portion of its population.
- Local: the disturbance is felt in a rather restricted study zone or influences a limited portion of its population.
- Specific: the impact is limited to a confined area of the study zone or affects only a part of the component.

## 3) Impact duration

This refers to the period of time during which an impact is perceived in the environment. It may be:

- Long-term: the disturbance is long-term if it is perceived as carrying through the entire lifetime of the project or beyond when the impacts are irreversible.
- Medium-term: the duration is medium-term when the impact carries through an extended period of time but not beyond the project's lifetime.
- Short-term: the duration is short-term when the impact is perceived only during the construction or remediation phase.

### *Impact significance*

The assessment of impact significance is based on the integration of the three indicators. From the result of each combination, a level of significance can be attributed to the impact based on the template provided in Table 6.1. The table weights each criterion identically. The template is used to assess the impacts before introducing mitigation measures and the residual effect after the implementation of these measures.

**Table 6.1 Impact assessment template**

Criteria			Significance
Magnitude	Geographic Extent	Duration	
High	Regional	Long-term	Major
		Medium-term	Major
		Short-term	Major
	Local	Long-term	Major
		Medium-term	Major
		Short-term	Moderate
	Specific	Long-term	Major
		Medium-term	Moderate
		Short-term	Moderate
Medium	Regional	Long-term	Major
		Medium-term	Moderate
		Short-term	Moderate
	Local	Long-term	Moderate
		Medium-term	Moderate
		Short-term	Minor
	Specific	Long-term	Moderate
		Medium-term	Minor
		Short-term	Minor
Low	Regional	Long-term	Moderate
		Medium-term	Minor
		Short-term	Minor
	Local	Long-term	Minor
		Medium-term	Minor
		Short-term	Very minor
	Specific	Long-term	Minor
		Medium-term	Very minor
		Short-term	Very minor

### 6.2.3 Risk analysis methodology

An assessment of the risks posed by the Matoush project for the ecosystem and human health was conducted by the proponent. This analysis was carried out after evaluating the additional contaminant concentrations that are anticipated from the project and identifying the exposure pathway, the potential receptors or groups of individuals that could be exposed to those contaminants and the parameters on which to base calculations of exposure dose.

A selection process was completed to identify COPC at the site. They were determined based on the highest baseline concentrations recorded in the soil and surface water at the site and by adding the anticipated incremental concentrations from the project activities.

The receptors (Table 6.2) that could be affected by the COPC identified were chosen to cover various exposure scenarios and according to their cultural significance, role in the ecosystem or use in a traditional diet.

**Table 6.2 Receptors selected for risk analysis**

Ecological Component		Human Component
Terrestrial vegetation (various)	Mink	Cree First Nations - adult
Osprey	Muskrat	Camp cook
Red-tailed hawk	Snowshoe hare	
Greater scaup	Fox	
Mallard	Moose	
Spruce grouse	Benthic invertebrates	
Common merganser	Aquatic plants (various)	
Beaver	Lake whitefish	
Black bear	Northern pike	

Potential exposure pathways (contact, ingestion or absorption) for COPC are related primarily to the consumption of food exposed to those contaminants and exposure to gamma radiation. The analysis presented by the proponent and its consultants also takes exposure factors such as duration and frequency into account.

#### **6.2.4 Opinion of proponent**

In its responses to FRP-S, the proponent expressed the opinion that the methodology used for its impact assessment was transparent, reproducible and consistent, adding that as a result of discussions between component experts and project managers, the impact assessment was developed to achieve a balance between a number of elements, including technical expertise and knowledge of the host environment. The proponent added that in order to remove any perception of bias, environmental assessment officers considered the concerns and comments of local populations as well as the analyses carried out as part of other mining projects.

#### **6.2.5 Opinion of participants**

Few comments related directly to the impact assessment methodology, apart from those by the CRÉBJ (M10) expressing the view that the impact study had been conducted in accordance with the latest rules in this area and that it provided detailed information on the project's nature and impacts. However, despite the fact that the general approach was not invalidated, some participants (M05, M06) questioned the estimation of ecosystem-related values assigned by the proponent to certain components.

Also, a number of intervenors (M03, M04, M06, M07, M09, M11) were of the opinion that the impact study did not follow the directive and noted the proponent's failure to answer a number of questions raised by FRP-S. Comments on the impact study's failure to follow the directive focused on the lack of basic information on the environment and land occupancy by the Cree, as well as analysis of the project's cumulative effects and impacts associated with a future mining phase. It is therefore the level of information, rather than the methodology, that the participants find insufficient for a project impact assessment.

#### **6.2.6 Opinion of Review Panel**

Although the methodology and criteria used in the impact study may be found in many similar studies, FRP-S asked the proponent to deal with the limitations and biases in the method selected. However, the proponent's responses were still vague, making it impossible for FRP-S to determine what internal procedures had been introduced to minimize the uncertainties and limitations of the method used.

Reproducibility of the methods used by the proponent is a concern for FRP-S, which found it difficult to reproduce the assessment by the proponent in its own analysis because the inputs were sometimes unknown. FRP-S also questions the ecosystem and socio-economic values assigned by

the proponent to some of the valued environmental components (VEC), especially for wildlife. Specific methodological inadequacies for the different components (e.g., sampling, modeling, etc.) are covered later in this section.

To assess the significance of the project's environmental impacts, the proponent used three impact categories: major, moderate and minor. While the JBNQA permits the use of this weighting, the CEAA recognizes only two impacts: the presence of significant adverse effects and their absence. Since the purpose of the environmental assessment procedure under the CEAA is to determine whether the project will have significant environmental impacts after mitigation measures are applied, FRP-S must determine the significance of the residual effects as defined in the CEAA and not as categorized by the proponent. In the analysis of this project, the determination is limited to the direct effects of the project on the VEC (water, air, soil), as well as its indirect effects on human health. Issues related to the opening of the territory, economic benefits, quality of life and cultural aspects are dealt with in this report in the context of section 22 of the JBNQA, with reference to the agreement's guiding principles, set out in section 4.

As noted in sections 2 and 4 of this report, the FRP-S review is based on an assessment of the proponent's compliance with the guiding principles of the environmental and social protection regime set out in section 22 of the JBNQA, and on elements for review under the CEAA. FRP-S requested and received expert opinions from Health Canada and Environment Canada on the project's impacts on human health, on risk analysis parameters and risks associated with accidents and failures. Representatives of the CRA also called on independent experts to flesh out and comment on the analysis of cumulative effects, environmental characterization and ecotoxicological hazards. The CNSC was also involved in analyzing the project's effects on the key VEC in the study. Based on this body of expertise and the judgment of each member, FRP-S ruled on the impact analysis by the proponent and its consultants and on the extent of the project's environmental effects.

## **6.3 HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY**

### **6.3.1 Current conditions**

#### *Hydrology and quality of surface water and sediments*

The project is located upstream of Lake Mistassini. The local study area includes the lakes and rivers up and downstream from the project, most of which could potentially be impacted by the project.



To characterize the physical and chemical properties of the surface water and sediments of the water bodies in the watershed for the Matoush site, the proponent reviewed existing data and conducted five surveys between fall 2007 and summer 2009 in 12 lakes, two of which (lakes 14 and 15) were reference sites beyond the project's area of influence. The data presented below are taken from the proponent's ecotoxicological risk analysis carried out following a preliminary surface water and sedimentary quality impact assessment.

The information filed indicates that the water is generally acidic and very soft. Some metal concentrations are naturally high in the study zone, even exceeding existing federal and/or provincial standards for aluminum, beryllium, copper, iron, lead, mercury, selenium and zinc in some surface water samples.

The sediment analysis established that sediments were generally of good quality, with the surveys providing only a few instances where provincial or federal standards were exceeded, specifically for cadmium and mercury.

#### *Hydrogeology and groundwater quality*

The Matoush deposit lies in sedimentary rock (approximately 600 m) resting directly on granite and gabbro bedrock. The principal lithological units passing through the ramp are likely sandstone.

The proponent carried out a preliminary hydrogeological study, followed by a second geotechnical study on the site, to determine groundwater conditions and characteristics at the site. Differences in groundwater levels, possibly attributable to the presence of the Matoush fault, were noted between two groups of observation wells.

Groundwater samples were collected in July 2008 during the hydrogeological study and analyzed for different parameters, including metals, major ions and nutrients, hardness, alkalinity and radioisotopes. Metal concentrations in the groundwater are relatively low, with the exception of copper, which exceeds the standard set for groundwater quality.

### 6.3.2 Opinion of proponent

#### *Hydrology, quality of surface water and sediments*

In the proponent's opinion, the residual impacts of the project on the hydrological conditions of the environment are of minor significance. The maximum discharge from Lake 5 during operations at the site was expected to be 0.392 m<sup>3</sup>/s. This estimate was based on measurements taken at the hydrometric stations located at the site, water level readings from the lakes, projected activities at the site, and the period when the highest flow-rate was recorded (May 2008), making this a conservative value. The analysis suggests that the effluent discharged by the project will not affect the natural shoreline of Lake 5 and its outlet as it will not raise the level beyond natural fluctuations. Levels and flows will be monitored to ensure that no excessive variations occur. Drainage ditches will also be inspected daily.

The main potential source of impact on surface water and sediment quality is the discharge of treated effluent into Lake 5. Accidental events such as spills close to or in a lake or river may also affect surface water and sediment quality. Since few data have been collected on the aquatic environment and it is uncertain how much water will be generated at the site and subsequently treated and discharged into the environment, the proponent could not make a preliminary assessment of impacts produced by seasonal trends and variations in the aquatic environment characteristics. The proponent notes that future water quality characterization will include all bodies of water included in the 2009 land survey.

The proponent intends to introduce a procedure to manage accidental spills, including spill kits placed at strategic locations on the site (see also section 8 below). Apart from the water treatment plant, no special measures are proposed to mitigate the impact of effluent discharge on surface water quality, given the preliminary nature of this aspect of the project at the time of impact assessment. To ensure that mine water will be treated and discharged into Lake Matoush in accordance with MDDEP criteria, Strateco Resources instead plans to reassess the impact of effluent discharge on surface water quality when effluent quantity and quality are better known. The proponent also notes that the MDDEP is currently developing environmental discharge objectives on the basis of which final effluent concentrations will be defined.

While the preliminary assessment concludes that the potential residual impact will be significant, the proponent believes that this conclusion is based on highly conservative assumptions and criteria, such as a continuous effluent flow rate equal to 100 m<sup>3</sup>/h, which corresponds to the maximum capacity of the treatment plant. In order to assess the impacts of the project on the aquatic

environment and, further to a recommendation by the consultant that conducted the preliminary water quality analysis, the proponent has begun an ecotoxicological and toxicological risk analysis.

As part of the risk analysis, the concentrations of contaminants in surface water liable to result from the probable effluent discharge (40 m<sup>3</sup>/h) were compared with various criteria affecting aquatic life (see also section 6.5.2), including the limits recommended by the Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life, where applicable. Surface water was reanalyzed to assess the risks to human health (see section 6.6.2), based on Health Canada's drinking water guidelines.

In the impact study, the COPC assessment was based on the maximum values obtained from the water quality analysis of all the lakes in the study zone. After submitting the impact study, the proponent provided a revised version of the COPC, based this time on the average values of the water quality parameters measured in 2009 in Lake 5 only. The revised figures are reproduced in Table 6.3. Unlike the previous analysis presented in the impact study, this analysis covered all the contaminants and used lower detection limits for a number of them.

**Table 6.3 Selection of contaminants of potential concern – surface water**

Analyte	Project	Baseline Concentrations <sup>(b)</sup>	Ratio of Project/Baseline	Base-line+ Project	MDDEP Quality Criteria			CCME Protection of Aquatic Life (Freshwater))	Project> Guidelines	Baseline+ Project> Guidelines?	Ratio of Project/Baseline >1 %?	With Tox. Data?	COPC
	Dilution (15:1) Treated Mine Water (Max.)				Protection of Aquatic Life (Chronic Effect) <sup>a</sup>	Protection of Terrestrial Ichthyophage Wildlife	Prevention of Contamination (Water and Aquatic Organisms)						
<b>Metal (ug/L)</b>													
Aluminum	1.3	100	1.3%	101.3	87	-	200	5	N	Y	Y	Y	(d)
Antimony	0.15	0.02	727%	0.17	240	-	6	-	N	N	Y	Y	
Arsenic	1.35	0.19	709%	1.54	150	-	10	5	N	N	Y	Y	
Barium	32	4.4	727%	36.4	79.1	-	1000	-	N	N	Y	Y	
Beryllium	0.007	0.002	333%	0.009	0.041	-	4	-	N	N	Y	Y	
Boron	17.7	0.9	1970%	18.6	1900	-	5000	-	N	N	Y	Y	
Cadmium	0.006	0.014	44%	0.02	0.082	-	5	0.017	N	Y	Y	Y	(e)
Chromium	0.08	0.12	67%	0.2	-	-	50	8.9	N	N	Y	Y	
Cobalt	17.7	0.059	30057%	17.8	100	-	-	-	N	N	Y	Y	
Copper	0.27	0.24	111%	0.52	2.36	-	1000	2	N	N	Y	Y	
Iron	1.3	120	1.1%	121	1300	-	300	300	N	N	Y	Y	
Lead	0.085	0.31	28%	0.39	0.41	-	10	1	N	N	Y	Y	
Manganese	61	6.20	991%	68	469	-	50	-	Y	Y	Y	Y	Y
Mercury	-	0.002	-	0.0018	0.91	0.0013	0.0018	0.026	-	Y	N	Y	
Molybdenum	0.19	0.01	1907%	0.20	3200	-	70	73	N	N	Y	Y	
Nickel	7.8	0.12	6500%	7.92	13.4	-	20	25	N	N	Y	Y	
Selenium	3.5	0.15	2311%	3.6	5	-	10	1	Y	Y	Y	Y	Y
Silver	0.007	0.001	667%	0.008	0.1	-	100	0.1	N	N	Y	Y	
Strontium	30.9	3.7	836%	34.6	8300	-	-	-	N	N	Y	Y	
Thallium	0.02	0.003	843%	0.024	7.2	-	1.7	0.8	N	N	Y	Y	
Titanium	0.04	1.84	2.2%	1.9	-	-	-	-	-	-	Y	N	

Analyte	Project	Baseline Concentrations <sup>(b)</sup>	Ratio of Project/ Baseline	Base- line+ Project	MDDEP Quality Criteria			CCME Protection of Aquatic Life (Freshwater)	Project> Guide- lines	Baseline.+ Project> Guide- lines?	Ratio of Project/ Baseline >1 %?	With Tox. Data?	COPC
	Dilution (15:1) Treated Mine Water (Max.)				Protection of Aquatic Life (Chronic Effect) <sup>a</sup>	Protection of Ichthyophage Terrestrial Wildlife	Prevention of Contamination (Water and Aquatic Organisms)						
Uranium	6.7	0.005	128205%	6.7	14	-	20	5.5 <sup>(c)</sup>	Y <sup>(c)</sup>	Y <sup>(c)</sup>	Y	Y	Y
Vanadium	0.009	0.14	6.7%	0.15	12	-	100	-	N	N	Y	Y	
Zinc	6.8	1.90	358%	8.7	30.6	-	5000	30	N	N	Y	Y	

N.B: a – The recommended values for barium, beryllium, cadmium, copper, lead, manganese, nickel and zinc assumed a hardness of 20 mg/L.

b – Data on Lake 5 came from monitoring analyses carried out in 2009.

c – Provisional limit.

d – Baseline data for the sample taken in 2009 are at the lower limit of the range of predicted conditions, according to data obtained for all the lakes in the zone. As the increase attributed to the project is low and within the variation observed in the baseline data collected, the CCME did not include aluminum in the COPC.

e – Although the concentration of cadmium (baseline+ project) exceeds the provisional limit set in 1996 by the CCME, it is still below the limit set by Quebec, which is based on a recent study by the US EPA. As a result, cadmium is not included in the COPC.

A dash ( - ) means that data are unavailable

Yes (Y) / No (N)

### *Hydrogeology and groundwater quality*

The proponent assesses the residual impacts of the project on hydrogeological conditions and groundwater quality as minor. Potential impact sources identified by the proponent relate to waste rock management, the risk of accidental spills and potential water infiltration during underground work.

To improve groundwater characterization, Strateco agreed to implement a continuous surveillance program during the project and to apply standard mining practices to limit water inflow. Also, the following mitigation measures will be implemented at the site to reduce the effects of future activities on hydrogeology and groundwater quality:

- If applicable, faults and other structures may be grouted to reduce significant groundwater inflows.
- Clean water north of the project site will be diverted from the project area.
- There may be contaminated water in the ditches and surface water catch basins, so they will be inspected daily and the water will be analyzed and treated as required.
- Strateco will implement a waste characterization and verification program to keep clean and special waste separate. To minimize the risk of contaminants leaching from the waste pads into the environment, (a) the waste pads will be lined with a membrane; (b) runoff water from the pads will be collected and treated as required; and (c) the quality of local groundwater will be monitored.

### **6.3.3 Opinion of participants**

Some participants (M01, M02, M05, M06) expressed concern about the project's potential serious impacts on surface water; moreover, a number of participants identified the lack of basic hydrogeological information (on surface water and groundwater) as a significant omission.

The treatment of contaminated water and sludge management, seasonal estimates for discharge into the receiving lake (possibility of spring shock during ice melt, weather considerations, etc.) and effluent monitoring in specific were also serious concerns for the participants (M03, M04, M05, M06).

#### **6.3.4 Opinion of Review Panel**

Overall, FRP-S is satisfied that the infrastructure proposed by the proponent for the waste characterization, verification and separation program is adequate and will reduce the risk of leaching or diffusion of contaminants into the aquatic environment.

FRP-S is also of the opinion that Strateco's proposal to collect baseline data and improve its understanding of environmental conditions with respect to water during exploration work should be closely monitored. FRP-S believes that this comprehensive program is necessary because so few data were collected in the initial land surveys, in particular for groundwater. As a result, seasonal variations in aquatic and hydrogeological conditions cannot be assessed. Some uncertainty remains concerning the extent of the project's impacts on this component. FRP-S also believes that both the oversight agencies and the proponent must pay particular attention to maintaining a consistent definition of the parameters (location, frequency, periods, etc.) for monitoring and follow-up of the aquatic environment.

The CNSC informed FRP-S that the mine water treatment technologies proposed by Strateco Resources are similar to those for other uranium mines operating in Canada and that when those technologies are well managed, they perform well. Although concentrations of contaminants in the aquatic environment are less significant than the background limits used for the risk analysis, FRP-S believes that the following recommendations are necessary:

**Recommendation 4: New results from monitoring the aquatic environment must be collected and communicated to decision-making authorities during the construction work and before any effluent is discharged. Additional measures may be required where effluent volume is greater than predicted and water quality approaches bounding limits for the risk analysis.**

**Recommendation 5: As part of surface water quality monitoring, FRP-S recommends that a surface water sampling station be installed further downstream from the operations site to address concerns expressed by the public about the potential effects of the project on the integrity of ecosystems within the future ATO Park.**

FRP-S is particularly concerned about the effects of the final effluent on surface water quality. This concern stems from the fact that the effluent discharge point will be located above the surface of the receiving lake, which may result in contaminants accumulating on the lake surface in winter and producing spring shock during the melt, which could affect water quality as well as aquatic wildlife

and plants. In the additional information submitted to FRP-S, the proponent states that this location provides better control, as the effluent can be observed directly. FRP-S finds this argument inadequate, as the benefits perceived by the proponent in terms of effluent control are outweighed by the disadvantages given the extent of the potential impacts of spring shock.

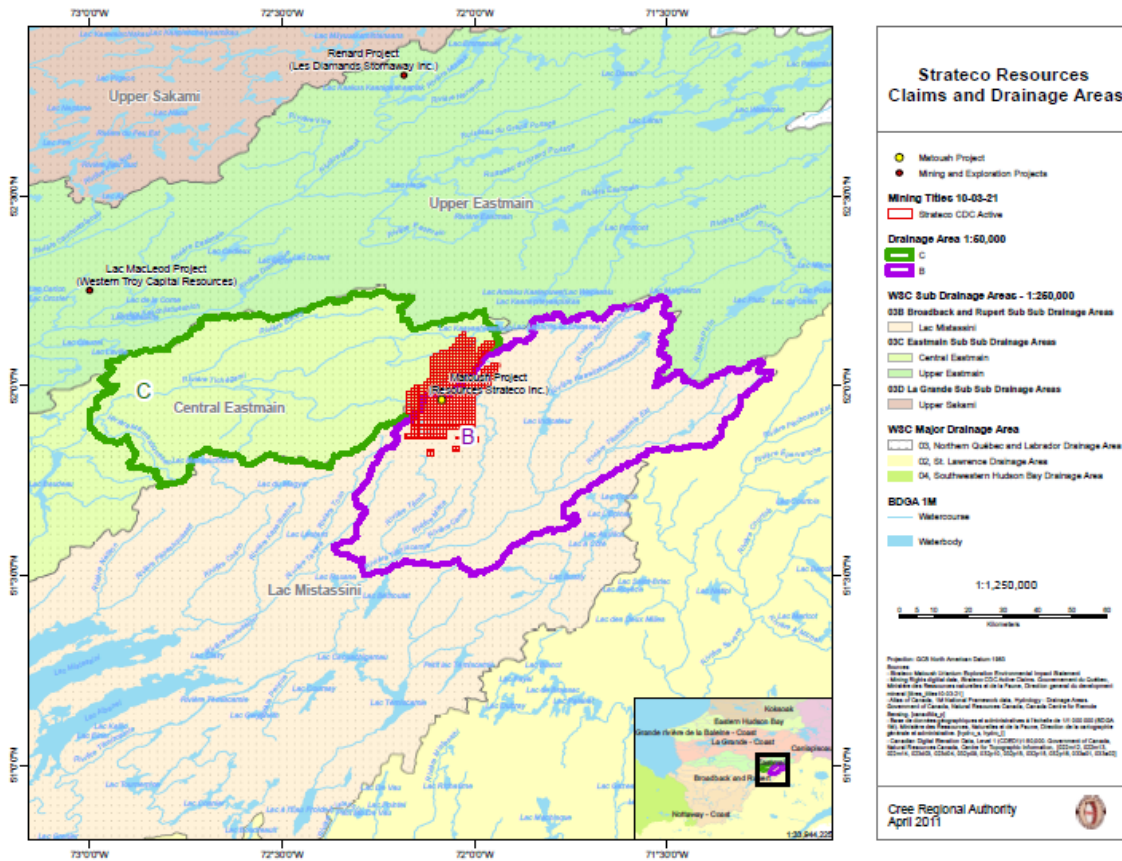
**Recommendation 6: To prevent the accumulation of mining effluent on the surface of Lake Matoush and to prevent potential successive spring shocks from contributing to a cumulative effect, FRP-S is of the opinion that the proponent should modify its effluent outlet so that it is under water, below the ice cover and in a water column sufficient to dilute it.**

The proponent also explains that its mining project is located on a sub-watershed that flows toward Mistissini. In its assessment, FRP-S examined the issue of surface water and discovered that the camp is located at the head of two sub-watersheds (see Map 2). The first (B) flows southward and belongs to the Broadback and Rupert hydrographic system. According to the CRA, the second (C) flows westward and could be part of the Eastmain Basin.

**Recommendation 7: FRP-S recommends that the Federal Administrator and the CNSC ask Strateco to: (a) submit a model of sub-watershed B—where the project is located—to understand how the effluent will act, i.e., its effects and dispersion; and (b) plan for stations to confirm FRP-S' hypothesis concerning the existence of a second sub-watershed and to provide a better understanding of the receiving environment in the event of future mining, for example, and—more particularly—in the event of the proponent's having to propose alternatives to its project.**

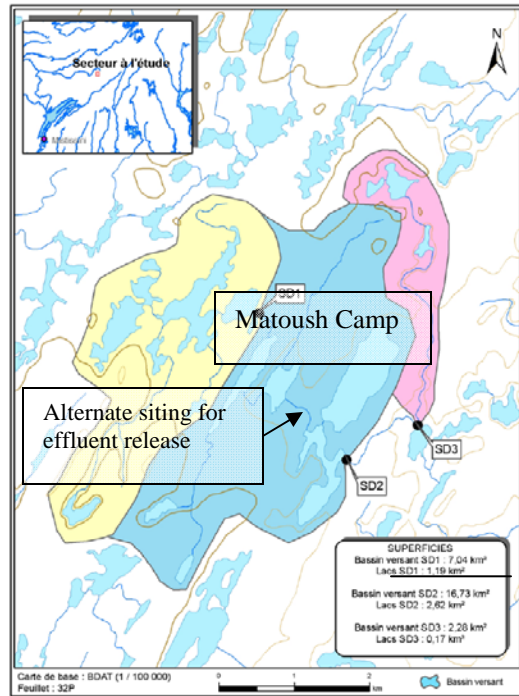


Map 2. Sub-watersheds around Matoush project



Finally, in April 2011, the CNSC informed FRP-S that the proponent had submitted an alternate location for the effluent, which would be discharged into a creek southwest of the main camp rather than into Lake Matoush (see Map 3):

### Map 3. Proposed alternate siting for effluent release



Source: Strateco Resources, 2011

Selection of this alternate location would avoid two problems: (1) the fact that the drinking water intake is currently planned for the same lake that receives the effluent and (2) the potential spring shock in Lake Matoush. In the opinion of FRP-S, however, the risk analysis and potential effects on aquatic wildlife and habitat should be reviewed.

**Recommendation 8: FRP-S recommends that, before issuing any licences, the Federal Administrator and the CNSC require Strateco to submit a new risk and impact analysis on the proposed alternate site for the final effluent.**

**Recommendation 9: If an alternate effluent discharge is not chosen, FRP-S is of the opinion that the proponent should not draw drinking water from the lake into which effluent is discharged. Given the expressions of concern over the potential environmental impacts of the effluent, FRP-S recommends that the CNSC and the Federal Administrator require the proponent to explore alternatives for drinking water intake as a precaution.**

**Conclusion 1: Given the details provided in the risk analysis and because the effects of the project on the aquatic environment are liable to be monitored and followed up in the event of a probable discharge of 40 m<sup>3</sup>/h, FRP-S is satisfied that this environmental component is unlikely to be significantly affected, as defined in the CEEA, if the proposed series of mitigation and follow-up measures (see section 11) is implemented.**

**This conclusion relates to a probable effluent volume scenario. However, owing to lingering uncertainties concerning effluent siting and effluent discharge volumes, the Federal Administrator and the CNSC must take care before issuing any future licences, as additional mitigation and follow-up measures could be required.**

## **6.4 AIR QUALITY**

### **6.4.1 Current conditions**

#### *Sources of atmospheric emissions*

Sources of atmospheric emissions for the Matoush project include the following: air removed from underground drifts, fugitive emissions from the waste rock storage pad, rock crushing and the on-site power plant. The diesel generators that supply electricity to the mining camps emit conventional pollutants, such as nitrogen oxide, sulphur dioxide, carbon monoxide, particulate matter and volatile organic compounds (VOC). The proponent expects that the air removed from the underground drifts will contain low concentrations of dust, radon and various metals, as well as conventional pollutants released by diesel equipment and propane gas heaters used in the underground drifts. The proponent assumes that metal concentrations in dust produced by the rock-crushing process are the same as those in dust contained in the air removed from the underground drifts.

At the site, rock could be crushed at different locations and in several steps: primary crushing, secondary crushing and material handling from the loader to the crusher, then from the crusher to the pad or to the transport truck. The estimate of particulate emissions from the crushing process assumes a 0.2 Kg/Mg coefficient of emission for low-moisture ore and a crushing rate of 200 tonnes per hour.

#### *Current air quality*

To establish background air quality levels at the Matoush site, the proponent measured the concentration of total suspended particles, metals, NO<sub>x</sub>, NO<sub>2</sub> and SO<sub>2</sub> at three different locations. The concentration of total suspended particles ranged between 3.5 µg/m<sup>3</sup> and 119.4 µg/m<sup>3</sup>.

The concentration of metals in ambient air was below laboratory detection limits. For non-detectable metals, the proponent calculated a concentration equal to the detection limit and specified that the concentration was, in fact, below that value. Metal concentrations at the detection limit remained well within background air quality concentrations.

NO<sub>2</sub> and SO<sub>2</sub> are the conventional pollutants most often examined. Their concentration is a function of the emissions from the exploration equipment and power plant facilities at the site. The proponent states that the additional concentration anticipated from those pollutants remains well within the limits set in Quebec's *Regulation Respecting the Quality of the Atmosphere*.

#### *Background radioactivity*

Radon monitoring established a mean radon concentration between 7 and 11 Bq/m<sup>3</sup> in most of the measurement locations. In Canada, reference locations generally produce radon concentrations of up to 20 Bq/m<sup>3</sup> (CNSC, 2011). In one measurement location at the site, the proponent found a concentration of 19 Bq/m<sup>3</sup>, which is slightly higher than elsewhere but still within the normal range of background concentrations in Canada (CNSC, 2011).

Calculations and measurements by the proponent give net ambient dose equivalent ranges for gamma radiation at the Matoush site from 41 to 85 nGy/h, similar to those recorded by Health Canada in 2007 at three locations in Quebec (Kuujuarapik, Montreal and Quebec City stations) ranging from 37 to 94 nGy/h (Health Canada, 2009).

Terrestrial gamma radiation was measured only at locations liable to be disrupted by exploration activities: e.g., at the planned storage site for materials excavated during construction of the ramp and preparation of support facilities. The locations were selected to detect any anomalies in existing radiation before proceeding to exploration activities.

Despite their low levels, the gamma radiation dose rates show certain variations which the proponent considers related to surface features. In the exposed sandstone zones, for example, the proponent observed an average dose rate of 0.05 to 0.075  $\mu\text{Sv/h}$ . The dose rate from gamma radiation is less than 0.025  $\mu\text{Sv/h}$  in peat soils and ranges from 0.025 to 0.050  $\mu\text{Sv/h}$  in soil-covered areas (including roads).

### *Climate and weather*

Information on climate and weather is important in order to establish climate conditions and forecast the dispersion patterns of airborne emissions that could potentially affect air quality in the study zone. Volume of precipitation has a marked effect on pollutant release and dispersion rates, while wind speed and direction strongly influence how pollutants are dispersed in the atmosphere.

The temperature summary for the Matoush site was based on 8,364 hourly data recorded from 2008; it does not represent long-term climatic normals. In 2008, the mean daily maximum and minimum temperatures at Matoush ranged from 13.3°C in August to -20.3°C in February, for an annual average of -3.0°C. At Chapais that same year, the mean daily maximum and minimum temperatures ranged from 16.0°C in July to -17.4°C in February. On average, the daily maximum temperature was -2.4°C at the Matoush site and 5.9°C at Chapais.

Precipitation statistics obtained in 2008 from the station at the site were compared with total precipitation data collected from the Chapais and La Grande IV stations, also in 2008. The total monthly precipitation measured in Matoush in 2008 ranged from 257.3 mm in November to 101.1 mm in September, with the greatest 24-hour precipitation (44.3 mm) occurring in March. Still in 2008, the greatest total monthly precipitation recorded for Chapais was 162.6 mm in June, and for La Grande IV, 120.00 mm in September. From 1971 to 2000, the greatest total precipitation at Matoush was twice the greatest mean precipitation recorded in Chapais.

Prevailing winds at the Matoush site in 2008 were from the west-northwest (12.3% of the time), at an average velocity of 11.9 km/h (3.3 m/s), and from the southwest (11.4% of the time), at an average velocity of 13.0 km/h (3.6 m/s).

*Background concentrations*

The purpose of the air quality assessment by the proponent was to predict the effects of activities associated with the advanced exploration project on the concentration of radon-222, dust and metals suspended in air (e.g., arsenic, molybdenum, nickel, selenium and zinc), as well as conventional pollutants (NO<sub>2</sub> and SO<sub>2</sub>) in the atmosphere. The anticipated effects on air quality were compared to the air quality standards proposed by Quebec in its draft *Regulation on Air Pollution Control* or, where Quebec had no standard, to other air quality background concentrations defined by the federal government or the Province of Ontario. The background concentrations are set out in tables 6.4 and 6.5.

**Table 6.4 Canadian ambient air quality objectives**

<b>Pollutant</b>	<b>Average Period</b>	<b>Maximum Desirable Level (µg/m<sup>3</sup>)</b>	<b>Maximum Acceptable Level (µg/m<sup>3</sup>)</b>	<b>Maximum Tolerable Level (µg/m<sup>3</sup>)</b>
Total suspended particulate (TSP)	1 year	60 <sup>(1)</sup>	70 <sup>(1)</sup>	-
	24 hours	-	120	400
SO <sub>2</sub>	1 year	30 <sup>(2)</sup>	50 <sup>(2)</sup>	-
	24 hours	150	300	-
	1 hour	450	650	-
NO <sub>2</sub>	1 year	60 <sup>(2)</sup>	100 <sup>(2)</sup>	-
	24 hours	-	200	-
	1 hour	-	400	-

<sup>(1)</sup> Geometric mean <sup>(2)</sup> Arithmetic mean

**Table 6.5 Background concentrations of various atmospheric contaminants**

	CASE	Contaminant	Ambient Air Quality Standard ( $\mu\text{g}/\text{m}^3$ )		
			1 Hour	24 Hours	Annual
Conventional Pollutants	10102-44-0	NO <sub>x</sub>	414	200	100
	7446-09-5	SO <sup>2</sup>	690	228	52
	630-08-0	CO	34,000	-	-
	-	PM (dust)	-	120	60
	7440-36-0	Sb	-	-	0,17
	7440-28-0	Th	-	-	0,25
Metals and Others	1344-28-1	Al <sub>2</sub> O <sub>3</sub>	-	120	-
	744-39-3	Ba	25	10	0.05
	1305-78-8	CaO	17	10	-
	7440-47-3	Cr	4	1.5	0.004
	1309-37-1	Fe <sub>2</sub> O <sub>3</sub>	62.5	25	-
	7439-93-2	Li	50	20	-
	1309-48-4	MgO	83	120	-
	7439-96-5	MnO	6.25	2.5	-
	7440-24-6	Sr	83	120	-
	13463-67-7	TiO <sub>2</sub>	83	34	-
	7440-22-4	Ag	2.5	1	0.23
	7440-38-2	As	1	0.3	0.003
	7440-41-7	Be	0.025	0.01	0.0004
	7440-43-9	Cd	0.0625	0.025	0.0036
	7440-48-4	Co	0.25	0.1	-
	7440-50-8	Cu	83	50	-
	7439-97-6	Hg	4	2	0.15
	7439-98-7	Mo	83.3	120	-
	7440-02-0	Ni	4	2	0.012
	7439-92-1	Pb <sub>SUM</sub>	1.25	0.5	0.1
	7782-49-2	Se	17	10	-
	7440-31-5	Sn	25	10	-
	13494-80-9	Te	25	10	-
	7440-61-1	U	-	0.02	-
	7440-62-2	V	4	2	1
	7440-66-6	Zn	83	120	-

	Canadian Ambient Air Quality Objectives
	Ontario: Ambient Air Quality Criteria (AAQC) and Reg. 419/05
	Ontario: new proposal
	Ontario (half-hour standard converted to one hour)
	Quebec: <i>Regulation on Air Pollution Control</i>

The maximum desirable concentration defines the long-term air quality objectives. The purpose of the maximum acceptable concentration is to protect the soil, water, vegetation and human health adequately from undesirable effects. The maximum tolerable concentration of a contaminant indicates the atmospheric concentration at which immediate measures must be taken.

Table 6.6 below gives the background atmospheric concentrations, based on current radiation protection limits and accepted dose conversion factors.

**Table 6.6 Background atmospheric concentrations – radioactivity**

Radioisotope	Background Levels (Bq/m <sup>3</sup> )
Nat U	0.014 (0.56 µg/m <sup>3</sup> )
Th-230	0.00085
Ra-226	0.013
Rn-222	60 (1)
Pb-210	0.021
Po-210	0.028

(1): Corresponding to the mean annual concentration of radon-222 in air attributed to the project (CNSC 2000).

To calculate background concentrations, the proponent used a continuous exposure (8,760 h/a) and normal adult inhalation rate (8,400 m<sup>3</sup>/a). The dose factors taken from the impact study are based on the most restrictive scenarios, in particular, on the presence of particles having a diameter of 1 µm and being in low-solubility categories.

The incremental level (added to the background level) of 60 Bq/m<sup>3</sup>, used for radon-222, is taken from the CNSC's *Radiation Protection Regulations* (CNSC 2000). The use of background concentrations gives a better grasp of the anticipated radioisotope concentrations' order of significance. Radiation exposure assessment is covered in section 6.6, which deals with human health.

Background concentrations of metals are taken from Quebec's Air Quality Criteria (2002) and the *Regulation on Pollution Control* (2009), published by the MDDEP. The air quality standards for



contaminants were based on Ontario's AAQC. The concentrations and standards used for the various contaminants were based on Strateco Resources' impact study.

#### **6.4.2 Opinion of proponent**

Comparison of the results of air quality modeling (carried out by Strateco during the exploration phase) with background levels led to the conclusion that the environmental effects of the Matoush project were unlikely to be significant.

The underground activities should not produce a large quantity of dust suspended in air or gaseous emissions. Machinery operating onsite will be equipped with anti-pollution systems, and engine idling will be prohibited to reduce disturbances caused by gas emissions, smoke or noise. Vehicular traffic is not expected to produce much dust, owing to the short driving distances involved. Access roads will be sprayed with water or a dust suppressant when required during the summer months. Waste pads will receive the same treatment, although little wind erosion is anticipated given the low friability of the rock and the grain size of the excavated material.

The proponent expects that the emissions produced by blasting will contain nitrogen oxides and dust. However, the quantity and dispersion of those emissions cannot be predicted. Strateco will apply industry-standard methods to minimize emissions. Predictions of NO<sub>2</sub> and SO<sub>2</sub> emissions from the exploration materials and on-site power plant are well within background levels. Strateco has accordingly concluded that contaminant discharges into the air attributable to the Matoush project will have little measurable impact on the surrounding environment.

Atmospheric dispersion modeling focused on total suspended particulates (TSP) for which the necessary data was available. As additional data becomes available on the TSP sub-fractions, including PM<sub>10</sub> and PM<sub>2.5</sub>, they will be incorporated into the model. For an initial estimate, PM<sub>10</sub> are assumed to account for half the TSP and PM<sub>2.5</sub> for half the PM<sub>10</sub>. Based on these assumptions, Strateco expects that the highest concentrations measured during a 24-hour period will be less than any set limit based on health criteria, and considers it prudent to use the TSP in dose calculations. The maximum additional increase in concentration of particulate matter or TSP in the vicinity of the park is estimated at about 219–230 µg/m<sup>3</sup> for a one-hour period, 19 to 20 µg/m<sup>3</sup> for a 24-hour period and 0.7 to 0.8 µg/m<sup>3</sup> for a year. Since those additional concentrations are well within the air quality background levels set for the project, Strateco has concluded that the project should not adversely affect the TSP concentration in the local atmospheric environment.

Since the project's impacts on annual arsenic, cobalt, copper, lead, nickel, molybdenum, selenium and zinc levels are all at least one order of magnitude less than the background level, Strateco has concluded that the Matoush project will have no adverse effects on metal concentrations in the atmospheric environment.

Based on the estimates of radon emissions from air removed from the underground drifts via the ramp or an airshaft, the maximum annual incremental concentrations of radon-222 are predicted to be in the range of 0.05 Bq/m<sup>3</sup> in the immediate vicinity of the proposed ATO Park east of the Matoush property. As these concentrations are much lower than the accepted increase in background level of 60 Bq/m<sup>3</sup> recommended in the CNSC Regulations (CNSC, 2000), Strateco has concluded that, given the results of the atmospheric dispersion assessment, the Matoush project should have no negative impacts on local radon-222 concentrations or on the health of persons exposed to radon by inhalation.

Gamma radiation dose rates from the site are within the range of average gamma dose rates measured in other areas of Quebec (throughout Canada). Radioactive materials removed from the mine will be managed during the Matoush project and returned underground at decommissioning. Following decommissioning gamma radiation will be measured and compared to the baseline survey to verify that radiation levels are low. Given that the storage of radioactive materials will be managed by Strateco during operations and that they will be returned underground at decommissioning it is expected that increases to radiation doses received by members of the public from the Matoush project will be very low.

#### **6.4.3 Opinion of participants**

From our reading of the transcripts of the information sessions held by the review panels (V01, V02), we note that the vast majority of comments, questions and concerns offered by the public concerning air quality relate to radon and its impacts on workers at the site and the public. A number of presentations made in the information sessions organized by the review committees and other groups or authorities also focused on this issue.

Two participants (M05, M06) also challenged the criteria and methods used by the proponent to assess the atmospheric dispersion of contaminants. The CPAWS (M05) questioned the validity of the proponent's assessment of the atmospheric dispersion of pollutants based on average wind velocities, arguing that the assessment should have considered additional factors such as precipitation of certain pollutants into the soil, their uptake by the network of streams, rivers and lakes, and the probability of extreme climatic events (e.g., storms). Given those factors, CPAWS

believes that the proponent underestimates the extent of contaminant dispersion. CPAWS and one other participant (M06) expressed concern about the project's potential effects on the integrity of the future ATO Park's ecosystems, since the prevailing winds blow from the site toward the park.

Two participants wondered about the site's air quality (M06, M08). The CBHSSJB (M08) sought assurances that the proponent would comply with the toughest ventilation and air circulation standards to limit worker exposure to radon. One participant (M06) wondered about the risk posed by potentially radioactive dust from the waste rock storage areas and the measures in place to prevent its dispersal over the workers' camp. The CBHSSJB expressed the hope that spot samples taken at the site and around the region to measure air quality would be sent to the public health department and to the Local Cree Administrator of Mistissini.

#### **6.4.4 Opinion of Review Panel**

Based on its review of all the data and on the CNSC's expertise and opinions, FRP-S is satisfied that the proponent's air quality assessment follows the directive and that, on the whole, the proposed mitigation measures appear adequate.

The proponent has made a number of adjustments to the air quality monitoring measures initially proposed in response to FRP-S' request for additional information, particularly with regard to sampling frequency and the establishment of sampling stations. However, in order to validate data from the impact study and verify whether the mitigation measures are effective, FRP-S has recommended additional air quality monitoring measures, which are set out in section 11 and relate essentially to the requirement to verify the following:

- whether the proponent has taken all significant sources and contaminants into account;
- whether the modeling of suspended particle levels is adequate for the entire year;
- quality assurance and control for air quality monitoring.

**Conclusion 2: Given the proposed follow-up and surveillance measures, FRP-S is satisfied that the Matoush advanced exploration project is unlikely to cause significant adverse environmental effects, as defined in the CEEA, on air quality.**

## **6.5 WILDLIFE, PLANTS AND SPECIES AT RISK**

### **6.5.1 Current conditions**

To describe the current conditions of wildlife and plants on the site of future exploration activities and in the surrounding area, the proponent made field inventories, conducted literature reviews and requested information from the Government of Quebec.

#### *Plants*

The main vegetation groups in the study zone in order of importance were: black spruce moss, black spruce lichen and wetlands. Black spruce moss and black spruce lichen are characterized by dominance of black spruce and have a large shrub layer, including western blueberry, Labrador tea and black crowberry. The wetlands are essentially minerotrophic peat bogs.

For the purpose of chemical analysis of the vegetation, the proponent collected samples of black crowberry, blueberries, lichen, black spruce, Labrador tea, dwarf birch and yellow pond lily. Chemical concentrations were comparable for the local and regional study zones, except for mercury, lead and manganese, which showed higher levels in some samples from within a 3 km radius of the Matoush site. Other chemical elements showed higher levels in some samples from the regional zone. This was the case for cobalt (birch), selenium (lichen), strontium (Labrador tea and crowberry), titanium (Labrador tea and blueberry) and zinc (Labrador tea). Uranium was detected in samples of aquatic vegetation.

The proponent reported that Cree communities use plants for food, tools, and medicinal purposes. Persons interviewed by the proponent noted that the study zone was not used for plant collection, but that blueberry picking sometimes took place in season. Traditional plant use was not identified as a concern during these interviews.

#### *Aquatic wildlife*

Phytoplankton and zooplankton sampling programs were developed to characterize the species present and the seasonal variability of plankton communities in five of the lakes in the study zone. The receiving lake (Matoush) was sampled at the end of summer 2009 only. To characterize the community during extreme periods in its annual cycle, two sampling seasons were completed, one in spring and one in late summer, corresponding to the period of low abundance following the ice melt (spring) and the period of maximum abundance and biomass (end of summer) respectively. Phytoplankton and zooplankton were similarly diverse in all the lakes sampled.

Benthic invertebrates were sampled in fall 2007 and 2008. Some sampling stations from 2007 were not continued in 2008, including the one at the receiving lake, while others were added. Overall, benthic density was generally low.

To determine the presence and relative abundance of fish species in the watershed, seven lakes and seven streams were inventoried in fall 2007 and spring 2008. Only six fish species were taken, none of which were at risk. Brook trout, burbot, lake whitefish, northern pike, white sucker and lake chub were caught; internal and external exams and chemical analyses were performed on them. Both the external and internal exams showed good overall health. Chemical analyses of flesh showed that the existing 0.5 µg/g allowable limit of mercury concentration for human consumption was exceeded only in the flesh of the northern pike.

In terms of fish habitat, the lakes studied averaged 3 m in depth, to a maximum of 7 m in the receiving lake. Locations with the most potential for spawning for each of the species identified were provided in the additional information filed with FRP-S. Because of its depth, Lake Matoush appears to be the preferred habitat for large species, including lake whitefish, which were only caught in that lake.

The proponent also provided information on fish movement in the watershed's rivers and lakes. Based on the habitat preference of fish species in the study, the characteristics of habitats present in streams and the flow system, fish are unlikely to travel regularly between lakes and streams. Some small fish species, such as lake chub, and juveniles of large species, including brook trout, were found in streams close to lakes. However, their ability to cross a waterway is limited by the flow regime and coarse substrate present in several sections of the streams. In late summer, movement of small fish between lakes is also limited by low water levels in some streams.

Two of the species identified are of sport-fishing interest: brook trout and northern pike. Also, lake whitefish, white sucker and burbot are harvested by traditional users of the land for subsistence purposes.

#### *Terrestrial wildlife*

In order to observe and characterize terrestrial and avian wildlife, the proponent carried out six field programs in 2008 and 2009.

Field observations indicate the presence of terrestrial wildlife with a low degree of diversity and abundance, which the proponent believes jibes with the low degree of habitat diversification in the study zone. The results of chemical analyses on small mammals demonstrate higher concentrations of aluminum, cadmium, lead, manganese, mercury, strontium, titanium, zinc and polonium-210 in the local study zone than in the regional zone.

Inventories of carnivores, fur-bearing animals and semi-aquatic species, as well as information collected from Cree users (trappers) by the proponent, indicate that the marten, weasel and otter are the most common in the regional study zone. The presence of large ungulates such as caribou and moose was also observed, including a network of caribou tracks about 20 km northeast of the camp. Trappers informed the proponent that the Indicator Lake area, located about 16 km southwest of the camp, is a promising hunting area for big game, especially moose.

#### *Avian wildlife*

Yellow-rumped warblers and ruby-crowned kinglets are the most common species of breeding birds. A total of 11 aquatic bird species were observed, the most common being the Canada goose, the surf scoter and various species of merganser and duck. Three species of raptors were observed: the bald eagle, the hawk owl and the boreal owl.

#### *Amphibians*

Reptiles and amphibians were inventoried within a 5-km radius of the camp. The two species observed and heard were the American toad and the spring peeper. No reptiles were observed.

#### *Species at risk*

In its impact study, the proponent presented a table listing at-risk wildlife and plants that could be living in the study zone. The proponent identified a herd of woodland caribou (a threatened species) whose tracks were observed near the camp. Two bird species, the bald eagle and the rusty blackbird, respectively designated as “vulnerable” and “of special concern,” were also observed. No plant species were identified as being at risk.

## 6.5.2 Opinion of proponent

### *Plants*

In the proponent's view, the main source of potential impact on soils and vegetation in the local area is both the tree clearing required for site preparation and the presence of surface infrastructures. Of the 15 ha planned, a 12-ha area consisting primarily of black spruce has already been cleared in preparation. Vehicles and machinery could potentially have an impact on vegetation and soil by stirring up dust, compacting the soil and presenting a risk of oil spill. The proponent believes that the impact of tree clearing will be moderate, while that of dust and the risk of accidental spills will be very minor. The impact of soil compaction and erosion is assessed as being of minor significance.

The overall significance of residual impacts on wildlife and plants is likely to be low or very low, given the mitigation measures proposed by the proponent: establishing limits on where machinery can operate, placing spill kits strategically onsite, establishing a spill response plan, completing spill reports as required, spraying access and main roads with water, performing equipment maintenance in the garages only, choosing double-walled gas tanks, and using previously removed organic matter to help revegetation at the site.

According to additional material the proponent provided to FRP-S, additional vegetation will be lost in preparing the borrow pits. The proponent did not assess the impact of this project component on wildlife and plants, but did indicate that these sites will not result in the loss of wetlands. Moreover, the proponent expects that the temporary storage site for contaminated soil will have little impact on soil and vegetation quality. Since an impermeable containment cell and containers will be used for storage, runoff will be diverted and the containers will be covered by an impermeable membrane to reduce contact with rain or snow, the proponent is satisfied that the residual effects of the storage site will be negligible.

### *Aquatic wildlife*

Apart from potential exposure to environmental contaminants, the project's potential impact on fish and fish habitat is primarily related to effluent spills into Lake 5 (Matoush), the presence of two pumping stations, the increase in suspended matter and blasting during excavation. The proponent also identifies the anticipated increase in fishing pressure as a potential source of impact on this environmental component. In the project impact assessment, fish and fish habitat were the only components of the biological environment to which the proponent attributed increased socio-economic value, based on conversations and consultations with land users.

The final effluent may affect water quality and food availability for fish. An increase is anticipated in suspended solids, which could affect fish respiration, feeding capacity and egg development. However, given the low increase in suspended matter, from about 2 mg/L up to about 7 mg/L, this impact is considered low. The calculation would also consider the repair and use of access roads on the site.

Excavation of the exploration ramp will involve blasting, which will create shock waves radiating outward from the point of detonation. The drop in ambient hydrostatic pressure created by the shock waves can adversely affect fish. The significance of that impact was not specifically assessed by the proponent, who nevertheless stated that blasting charges would be adjusted to meet federal guidelines.

The new water intake required for future site activities has the potential to cause accidental fish mortality, but this impact is considered minor. The pumping and discharge of waste water into the receiving lake also has the potential to affect water levels in the lake and at its outlet. This could in turn cause a change in near-shore spawning, rearing, foraging or refuge areas for fish inhabiting the lake and stream. According to the hydrology analysis submitted by the proponent, the potential change to lake levels is within natural water level fluctuations. Given these factors, the impact is expected to be minor.

In light of all the factors presented above, the project's impact on fish and fish habitat is considered moderately significant. As mitigation measures, the proponent intends to install soil retention structures the length of access roads alongside water bodies, perform regular maintenance on water intake and follow good management practices when work is underway near bodies of water. Once these measures have been implemented, the project's residual impacts on fish and fish habitat will be minor.

The proponent also expects that the improvement of site access roads and the increase in workers onsite could amplify fishing activity in the surrounding lakes. Since fish populations are limited in the study zone, the project could have a significant indirect impact on fish populations. To reduce this impact, fishing on the property will be prohibited for non-Aboriginal workers and no boats will be available for fishing, creating a moderate residual impact.



### *Terrestrial and avian wildlife*

The potential sources of impact on wildlife and birds identified by the proponent are mainly associated with deforestation and nuisances such as noise, lighting, dust and vibrations that could disturb wildlife during breeding and migration seasons. The risk of vehicle-animal collisions associated with the use of access roads at the site is also assessed.

Owing to the small area of deforestation and the low abundance and diversity of wildlife species present at the site and locally, the proponent mentioned that the impact on habitat and on wildlife and bird movement is considered minor. This is also the case for the impact of disturbance. The impact of vehicle-animal collisions is considered quite minor. Although a herd of woodland caribou has been observed near the site, the impact of the project on this protected species was not specifically assessed.

In order to mitigate impacts on birds, the proponent would avoid clearing trees during the nesting period (between April 30 and July 15). If tree must be cleared during this period, the proponent will conduct ground surveys to check for nests and will temporarily prohibit clearing in areas where any are found.

The proposed mitigation measures include revegetation, reforestation, and speed and lighting limits on access roads. After these measures have been implemented, the residual impacts on wildlife, birds and their habitat will remain minor.

### *Ecotoxicological risk assessment*

The ecotoxicological risk assessment (ERA) focused on the potential risks posed to non-human biota by radionuclide and non-radionuclide contaminants associated with the project. The assessment was conducted within a recognized framework in accordance with CCME and Environment Canada guidelines. The ERA covered the following tasks: site characterization (including COPC selection); development of a conceptual model of the site; receptor characterization; exposure assessment; hazard assessment; risk characterization; and uncertainty assessment. Although it is considered a preliminary risk assessment (i.e., a qualitative assessment of potential risks posed to significant ecological receptors), the ERA used semi-quantitative methods and site-specific environmental data.

The effects of COPC on the ecosystem were characterized by a screening index value, which provides an integrated description of the potential hazard, the exposure-response relationship and

the exposure assessment. The toxicity reference values used by the proponent are defined as concentrations that will cause no adverse effect; therefore, a screening index equal to or less than unity (1.0) ensures no effect on the ecosystem.

#### *Radiological contaminants*

The risk assessment sampled and examined all the radiological contaminants and their potential adverse effects on terrestrial and aquatic biota, comparing three background levels with three effluent discharge scenarios: most probable (40 m<sup>3</sup>/h), case A (22 m<sup>3</sup>/h) and case B (100 m<sup>3</sup>/h).

For terrestrial receptors, the screening index values remained below the reference values in all scenarios assessed. The proponent accordingly concluded that the radionuclides associated with the project pose no risk to terrestrial wildlife and birds, noting that the risk from the project remained within the natural variation of reference values at the Matoush site.

For aquatic receptors, the proponent concluded that the probable scenario and case A posed no risk, as the screening index values were less than 1. In the high effluent discharge scenario (100 m<sup>3</sup>/h), the screening index values were slightly higher than the reference value for aquatic plants, predator fish and forage fish.

#### *Other contaminants*

Given the ERA results, the proponent anticipated no adverse effect on terrestrial receptors at the Matoush site in the low (22 m<sup>3</sup>/h) or probable (40 m<sup>3</sup>/h) effluent discharge scenario. Although the background metal concentrations were considered high, the screening index values for the reference scenario were only exceeded for the scaup (because of selenium exposure). Background concentrations for zinc also produced higher screening index values for terrestrial receptors with a diet based primarily on aquatic organisms. However, new analyses showed lower background concentrations in surface water, so that zinc is no longer considered a COPC (see Table 6.3). The unlikely effluent discharge scenario (100 m<sup>3</sup>/h) scenario had an increased risk, especially for terrestrial receptors whose diet is based primarily on aquatic organisms.

The proponent found that in the low (22 m<sup>3</sup>/h) or most probable (40 m<sup>3</sup>/h) effluent discharge scenario, contaminants entering the surface water at the Matoush site were unlikely to produce any adverse effects on aquatic receptors. In the high effluent discharge scenario (100 m<sup>3</sup>/h), the screening indices for uranium, lead, nickel, selenium, zinc, lead-210 and radon-226 were greater

than 1. However, the proponent believes that local animal populations will adapt or acclimate to local conditions.

Based on the proponent's environmental characterization, natural concentrations of certain COPC already exceed the criteria set. The proponent accordingly concluded that any increase in concentrations attributable to the project would be negligible. However, the proponent stressed the importance of developing site-specific criteria to take naturally high concentrations into account, and noted that if the high effluent discharge scenario of 100 m<sup>3</sup>/h were to materialize, additional analyses would have to be carried out to obtain a more accurate assessment.

### **6.5.3 Opinion of participants**

In terms of wildlife and plants, the participants' (M02, M03, M04, M06, M07) comments related primarily to the quality of inventories and of biological environment characterization, and to methods of assessing project impacts on this component. Members of the public also expressed concern about the impacts of a future mine on aquatic and terrestrial wildlife.

The Cree Nation of Mistissini (M07) and CPAWS (M05) questioned the quality of the inventories taken by the proponent because they did not reflect the abundance of wildlife species in the area which would make it difficult to follow up and monitor the project's effects on wildlife and plants.

MiningWatch Canada (M03, M04) wondered specifically about the average value assigned to terrestrial wildlife in the proponent's assessment of the project's impact, since hunting and trapping are fundamental traditional activities for the Cree.

One participant (M06) expressed concern over the fact that the assessment of the project's impact on woodland caribou, which is a threatened species, is based on an analysis by a private proponent.

Finally, the CBHSSJB (M08) expressed concern regarding the risk of contamination of fish, migratory birds and terrestrial wildlife associated with a future mine as well as disturbance to habitats and migratory routes caused by noise and activities at the site. CBHSSJ felt there should also be consequences for hunting and trapping activities.

#### 6.5.4 Opinion of Review Panel

FRP-S supports the participants' opinion that the proponent's inventories cannot serve as the basis for an adequate wildlife and plant monitoring program, especially if the project eventually leads to a mining phase.

FRP-S also notes that the GCC in particular has, for some time now, expressed concerns about woodland caribou. Like CPAWS, FRP-S believes that this species should receive special treatment from the proponent due to its special status and it should be assigned a "high" rather than "moderate" socio-economic and ecosystem-based value in the magnitude assessment of the project's impact on the species. Given the comments on sightings of caribou and moose in the regional zone, and given the existence of ecosystems that could encourage their presence, it is reasonable to believe, as the Cree Nation of Mistissini noted, that the presence of wildlife and plants is not poor throughout the region covered by the impact study but may instead be sporadic. FRP-S recommends follow-up measures to detail and supplement the regional characterization of terrestrial wildlife and birds (see section 11).

Regarding the proponent's analysis of the significant impact of fishing activities on fish, FRP-S notes that Strateco will prohibit its non-Aboriginal workers and contractors from hunting or fishing at the site. However, given the high mercury levels observed in some fish species that could be eaten by local populations, FRP-S recommends a follow-up measure (see section 11) to check whether the Matoush project is contributing to the additional mercury present in the aquatic food chain.

With respect to access road repair and the opening of borrow pits, FRP-S notes that the proponent's conclusions on the extent of their impact on the biological environment are unclear. As noted in section 3.9, however, FRP-S is satisfied with the options presented by the proponent to repair existing roads, rather than construct new ones, and to optimize the use of the borrow pits already in operation.

##### *Ecotoxicological risk assessment*

The ERA dealt with the potential risk posed to terrestrial VEC by radionuclide and non-radionuclide contaminants. The main source of contaminant discharge is expected to be treated effluent; as a result, terrestrial VEC with little connection to aquatic systems (e.g., black bears) are unlikely to be measurably exposed to the discharges produced by the project.

The review of exposure to the potentially present radionuclide and non-radionuclide contaminants in effluent discharge revealed no risk of adverse effects for aquatic or terrestrial receptors that feed on aquatic organisms in the most probable case of an effluent discharge rate of 40 m<sup>3</sup>/h.

Based on conservative contaminant concentration levels and the maximum projected capacity of the effluent treatment plant (100 m<sup>3</sup>/h) and on the expertise of the CNSC, FRP-S identified a potential risk for aquatic receptors and terrestrial receptors that feed on aquatic organisms. Uranium, manganese, nickel, selenium, zinc, lead-210 and radium-226 were identified as potentially having an effect on aquatic receptors under such conditions. However, as mentioned in section 6.3, if the wastewater is treated, contaminant concentrations in the aquatic environment lower than the reference limits used for the risk analysis can be predicted, even in the highly improbable case of a continuous discharge rate of 100 m<sup>3</sup>/h.

The proponent has undertaken the submission of a new ecotoxicological risk assessment incorporating additional information on radiological doses to which biota are exposed. The assessment will be based on more-precise contamination scenarios, additional COPC and additional hydrological data, which will permit a better assessment of effluent quantity and quality before the licence is issued. FRP-S appreciates that the proponent agreed to redo this analysis at the CNSC's request. FRP-S strongly suggests that the new analysis be published on either the Internet registry of the Canadian Environmental Assessment Agency or the CNSC.

**Conclusion 3: FRP-S is satisfied that the Matoush advanced exploration project is unlikely to cause significant adverse effects, as defined in the CEEA, on this component, as the proponent's risk assessment is based on highly conservative estimates of contaminant concentrations related to the project, and because – in the likely case of effluent discharge at a rate of 40 m<sup>3</sup>/h – the exposure screening indicators are below the reference values for all terrestrial and aquatic receptors.**

**This conclusion is based on a probable effluent volume scenario. However, additional details are required concerning the methods and calculations used to estimate the radiological dose to biota, and these new data should be submitted to the CNSC for review. The Federal Administrator and the CNSC may take them into consideration before issuing future licences, as additional mitigation and follow-up measures may be required.**

## **6.6 HUMAN HEALTH**

The following section specifically concerns a risk assessment relating to human exposure to environmental contaminants, whether radiological or non-radiological. To avoid repetition, some relevant data concerning exposure pathways are presented in sections 6.4 (Air quality) and 6.5 (Ecotoxicological data) rather than in this section. Also, because they relate to other psychosocial parameters, perceived health risks and data dealing with certain health and lifestyle indicators (diabetes, obesity, smoking and drinking) are discussed in section 6.8 (Social and cultural issues).

### **6.6.1 Current conditions**

Trappers and their families generally use their land primarily during winter to hunt moose and trap, in the spring to hunt migratory birds and in the fall to hunt moose. However, preliminary consultations conducted by the proponent, indicate that community members seldom hunt, fish or trap on the Matoush site.

Users confirmed that they consume a mainly traditional diet while on their traplines. Amounts and species consumed were not specified. Users also mentioned that they picked berries in the summer on the traplines in the immediate vicinity of the Matoush site (lots M-16 and M-17). There is apparently less fishing on these traplines, with the exception of a few users, especially toward the end of summer. The use of medicinal plants was not mentioned.

However, from its consultations with members of the Mistissini community, including tallymen and other users of the study zone, the proponent was able to identify plants, fish, birds and mammals that are normally consumed, helping to identify potential exposure pathways and doses for environmental contaminants.

### **6.6.2 Opinion of proponent**

The proponent conducted a selection process to identify COPC at the site, based on the highest background concentrations recorded in surface water and soil on the site, by increasing the concentrations that the project could potentially produce. Manganese, nickel, uranium and radioisotopes (lead-210, polonium-210, radium-226, thorium-230 and uranium-238) were identified as key contaminants that could have an adverse effect on health. Finally, to analyze the risk to the public, two standard receptors were selected based on their degree of potential exposure; i.e., an adult Cree and the camp cook.

### *Risk of exposure to radiological substances*

Following the risk assessment of exposure to radiological COPC, Strateco concluded that, despite conservative exposure assumptions which maximize the potential for contact, the dose estimates for members of the public are well within the limit of 1 mSv/a. The incremental concentrations are primarily due to drinking water for the cook and the ingestion of fish and water for the member of the Cree community. Strateco also concluded that the increased exposure to radiological substances caused by the project would be quite low for members of the public and that the additional doses would remain within acceptable levels.

As for the exposure of workers to radon during underground work, the assessment covered three phases of the project: initial development of the ramp; exploration drilling at the -230 m level at the end of the side drifts and the ventilation raise; and exploration drilling at the end of the side drifts at the -300 m level. In each case, the exposure levels calculated were below the annual dose limits for radon progeny. As well, a radiation protection program will be introduced to manage cases of uranium concentrations detected in workers' urine or gamma radiation registered on workers' dosimeters.

### *Risk of exposure to other contaminants*

As in the ecotoxicological risk assessment, the characterization of the risk to humans of non-radiological contaminants involves incorporating the results of exposure and toxicity assessments.

Three exposure pathways were considered for the cook: water, soil and food. The same pathways were selected for the First Nations member, with an additional pathway: consumption of traditional food. The exposure time was estimated as being less for the First Nations member; i.e., with 10% of his or her time being spent at the Matoush site compared to 50% for the cook. The carcinogenic impact of nickel via the inhalation pathway was assessed for both receptors.

The assessment of additional concentrations of contaminants affecting surface water depends on the quality and physical characteristics of the effluent discharged into Lake Matoush. As mentioned earlier, three different dilution scenarios were proposed for the risk analysis:

Most probable: 15:1 dilution – 20 m<sup>3</sup>/h of water from the treatment plant and 20 m<sup>3</sup>/h of water from storm runoff catch basins, giving a total of 40 m<sup>3</sup>/h.

Case A: 150:1 dilution – 2 m<sup>3</sup>/h of water from treatment plant and 20 m<sup>3</sup>/h of water from storm runoff catch basins, giving a total of 22 m<sup>3</sup>/h.

Case B: 2.5:1 dilution – 80 m<sup>3</sup>/h of water from treatment plant and 20 m<sup>3</sup>/h of water from storm runoff catch basins, giving a total of 100 m<sup>3</sup>/h.

A hazard quotient (HQ) was determined by comparing the estimated exposure to the toxicity reference values. For the risk assessment, 20% of the dose or an HQ of 0.2 was used as acceptable exposure under each of the scenarios for the cook and an HQ of 0.1 was used for the First Nations member. For the camp cook, Strateco concluded that while the background HQ for manganese and uranium already exceeded 0.2, a small increase should be anticipated with the three scenarios proposed for manganese and nickel. For uranium, a larger increase was anticipated in the maximum exposure scenario (case B).

For the adult First Nations member, the proponent concluded that while the background HQ for uranium already exceeded 0.1, the HQ would increase significantly (HQ = 3.5) in the maximum exposure scenario (case B). Manganese exposure was shown to exceed the HQ of 0.1 in case B. Low nickel exposure was expected in the three scenarios and, in fact, the HQ did not exceed 0.1.

Strateco concluded that although the assumptions made at the start of the assessments were conservative, additional data and analyses would be required if an effluent discharge greater than the most probable discharge scenario of 40 m<sup>3</sup>/h was anticipated during operations.

The carcinogenicity assessment from exposure to nickel via inhalation produced an estimated incremental cancer risk calculated for a lifetime of  $4 \times 10^{-12}$  for the camp cook and  $1.2 \times 10^{-10}$  for the adult First Nations member. These data are significantly below the risk level applied by Health Canada of  $1 \times 10^{-6}$ .

### **6.6.3 Opinion of participants**

Some members of Mistissini's Cree community (V01) expressed concern over the project's potential impact on the health of workers and the public. In particular, intervenors questioned the proponent's choices in the analysis of human health risks, specifically, the selection of COPC and the receiving groups, which, in their opinion, should have included employees working underground (M06, M07, M08, and M11).



In the opinion of two intervenors associated with the health sector (V01, M11), green-lighting this advanced exploration phase would be tantamount to green-lighting a subsequent mining phase. Therefore, the proponent's analysis of health risks should, in their opinion, have covered the subsequent mining phase.

#### 6.6.4 Opinion of Review Panel

##### *Radiological contaminants*

For the radiological risk analysis, FRP-S turned to the CNSC for its expertise. Based on discussions with the proponent, the CNSC carried out an assessment covering the estimated radiation doses received by First Nations members (adult, child and infant) practising their traditional activities in the project zone. The assessment considered dietary characteristics and predicted radioactivity levels in water, soil and biota. Incremental doses associated with the project were predicted based on the probable effluent dilution scenario; these were on the order of 96 µSv/y for adults, 150 µSv/y for children and 68 µSv/y for infants, which is well within the public dose limit (Table 6.7).

**Table 6.7 Incremental doses for children and infants**

	Duck	Fish	Soil	Water	Total Inhalation Dose	Total Incremental Dose (µSv/y)
<b>Child</b>						
Most probable scenario	0.029279	142.6153	3.04333E-08	7.365217	6.38E-04	<b>150</b>
Case A	0.002928	14.26153	3.04333E-08	0.736522	6.38E-04	<b>15</b>
Case B	0.175673	858.7586	3.04333E-08	44.63768	6.38E-04	<b>904</b>
<b>Infant</b>						
Most probable scenario	0	0	2.39778E-07	67.99483	8.71E-04	<b>68</b>
Case A	0	0	2.39778E-07	6.799483	8.71E-04	<b>7</b>
Case B	0	0	2.39778E-07	412.0899	8.71E-04	<b>412</b>

The estimated doses corresponding to effluent dilution scenario B are also within the CNSC's public dose limit (1 mSv/y). CNSC staff does not consider those doses significant, since Strateco will have to show that the effluent dilution rate will be controlled in such a way as to keep the doses as low as

reasonably achievable (ALARA), in accordance with the *Radiation Protection Regulations* applied by the CNSC.

FRP-S also knows that, if the CNSC licences this project, Strateco will have to submit a radiation protection program pursuant to the *Radiation Protection Regulations*.

#### *Other contaminants*

On the question of risk of human exposure to non-radiological contaminants, FRP-S is satisfied that the data submitted by the proponent on predicted doses and exposure models raise no major issues for the Matoush exploration project if the most probable effluent discharge scenario is taken into account.

FRP-S also concurs with the proponent's conclusion that additional data and analyses will be required if an effluent discharge larger than the probable discharge of 40 m<sup>3</sup>/h is anticipated during operations.

**Conclusion 4: In light of the doses and scenarios predicted in the risk assessment, FRP-S believes that the Matoush advanced exploration project is not likely to cause significant adverse effects, as defined in the CEEA, on human health. However, additional data and analyses will be necessary if an effluent release larger than the probable release of 40m<sup>3</sup>/h is anticipated during operations.**

## **6.7 LAND USE**

### **6.7.1 Current conditions**

The Mistissini Cree are the main users of the land on which the Matoush project is located. The project borders on two Cree traplines (M17C and M24A) and the regional study zone touches on six traplines. The Cree users who met with the proponent still practise hunting, fishing, trapping and berry picking, but these activities primarily take place in the Indicator Lake valley—16 km east of the project boundaries. When they met with the proponent, the Cree who use the land did not identify any sites of special interest to hunters or trappers on or in the immediate vicinity of the Matoush property.

The Otish Mountains region is subject to two main types of development activity: mineral resources and tourism. A number of mining exploration projects are currently under way in the area. The

projects by Western Troy (copper, gold, silver, molybdenum) and Stornoway Diamond Corporation (diamond) are the most advanced, but a number of other companies<sup>9</sup> are currently involved in prospecting, sampling and surveying, primarily for uranium ore deposits.

Tourism development in the Otish Mountains region is closely tied to the Quebec government's ATO conservation park project. While the Matoush project lies outside the park boundaries, most of it is located in the Albnel, Mistissini and Waconichi Lakes Wildlife Sanctuary. According to the proponent's information, there is one campground on the shores of Lake Albnel but no other campgrounds or recreational facilities further to the north.

### **6.7.2 Opinion of proponent**

The land use impact assessment is based on three subcomponents: traditional activities, access to the land and regional development. In the proponent's view, as the remoteness of the area would reduce the number and magnitude of land use impacts, the project will have little impact on traditional activities. It is also estimated that the potential frightening off of terrestrial wildlife and the reduced potential for hunting and trapping activities will be short-lived. According to information provided to the proponent, the Cree who use the land did not identify any sites of special interest to hunters on the Matoush property. Based on information provided by users, the small area involved and the short timespan of the project, the proponent concludes that disturbance of traditional activities will be negligible.

On the question of recreational tourism development, in particular for the ATO Park, the proponent concludes that the distance between current and planned tourist and recreational activities and the project site is great enough to ensure that tourists will feel none of the project's impacts. Moreover, the lack of points of interest and the hunting and fishing restrictions imposed on Category III lands and wildlife reserves make it highly unlikely that the volume of non-First Nations visitors to the area will increase. Moreover, in its responses to FRP-S, the proponent notes that, currently, the only outfitters and campgrounds are located more than 100 km from the site.

The mitigation measures proposed by the proponent to limit the impacts associated with land organization and land use consist essentially of limiting noise, dust and pollution by machinery and equipment.

The proponent is of the view that the residual impacts of the project on access to the land, traditional activities and regional development will be positive because, in filing the impact study, it considered

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<sup>9</sup> About 14 companies as of 2010, according to MTQ data.

the potential effects of the permanent road on those elements. However, the additional information requested by FRP-S and produced by the proponent made it clear that the MTQ—not Strateco—would be the prime contractor for the road project.

### **6.7.3 Opinion of participants**

A number of participants commented on the project's impact on land use and organization. The Cree Nation of Mistissini noted in its submission that, given the repercussions linked to improved access to the land by the Cree and non-First Nations peoples, the proponent should have consulted with Cree regional economic and social development organizations—in particular, the Cree Outfitters and Tourism Association (COTA).

The submission from the Cree Nation of Mistissini (M07) stated that the proponent underestimated the significance of a number of issues relating to land management when it concluded that the residual impacts on access to the land, traditional activities and regional development were positive. However, in the public hearing held in Chibougamau, a representative of the family on trapline M-17C (V04) stated that his family accepted the project and were all in agreement that it should go ahead. Although they were interested in the potential economic benefits, they also stressed the importance of protecting family hunting grounds and the environment and believed that the proponent should proceed with caution. According to the intervenor, a number of trappers around the Matoush site are in favour of the project; others remain reticent. In response to a question by a member of the committee, however, the intervenor admitted that his family members were unclear about the project's impacts and that additional explanations and clarifications would be required in order for them to understand the project impacts.

The CRÉBJ (M10) sought assurances that residents of the region would benefit from regional development. In its submission, the CRÉBJ stated that it had been mandated by the MRNF to establish regional commissions on the natural resources and territory of James Bay. Primarily, its mandate was to produce an integrated regional natural resources and territorial development plan. The CRÉBJ is also in the process of completing a five-year development plan for 2010–2015. According to the CRÉBJ, Strateco's proposed project will enable further consolidation of the James Bay mining industry's strategic position.

The CBHSSJB (M08) expressed concern about the impact of noise and activities from the project on migration paths and local wildlife, as well as the potential resulting disruption of hunting, fishing and trapping activities. In the opinion of MiningWatch Canada (M03, M04), the detail provided by the

proponent on the extent of traditional land use was inadequate. As a result, the impacts were not spelled out clearly enough.

A number of submissions and intervenors (M02, M05, M06, M07), including the Cree Nation of Mistissini (M07), questioned the coexistence of the Matoush project and the proposed ATO Park. Many believe that the Matoush project and the extension of Route 167 through the park will adversely affect tourism.

#### **6.7.4 Opinion of Review Panel**

##### *Maintenance of traditional activities*

FRP-S considers the data provided by the proponent and the proponent's assessment of the impact on traditional activities and regional development to be incomplete. Therefore, unlike the proponent, FRP-S cannot conclude that the residual impacts will be positive. Although it has seen no evidence that the Matoush exploration project may adversely affect use of the land for traditional activities, it wishes to point out that, in the case of a mining development, special attention must be paid to the scope and depth of the proponent's analysis; otherwise, it may be found unacceptable. If the project were to proceed to the operational phase, FRP-S believes that it could adversely affect traditional activities and limit future land use options.

##### *Conservation park*

FRP-S notes that the proponent has not assessed its project's impact on the mission of the ATO conservation park and on future tourism development activities other than the park. FRP-S concurs with a number of intervenors who wonder about the project's impact on regional tourism development—in particular, on the ATO conservation park and on the possibility of the two projects coexisting. Specifically, FRP-S wonders about a road passing through the park that could eventually be used to transport radioactive ore. Will the proponent's use of the road affect the ATO Park's conservation mission and, perhaps, the number of visitors it attracts and its tourism potential during the mining phase?

**Recommendation 10: FRP-S notes that, while the proponent has contacted the MDDEP about the ATO conservation park, it would also like to see the proponent consult with the Cree Outfitters and Tourism Association (COTA) and the Council of the Cree Nation of Mistissini to determine the anticipated impact of Route 167 and the Matoush project on regional tourism activities, and then introduce mitigation**

**measures based on their recommendations. It could immediately begin discussions of the measures planned if the Matoush project proceeds to the mining phase.**

*Governance and vision of regional development*

The proponent spent very little time on the topic of land organization. Land use was described briefly but no explanation was provided of the system of Cree traplines, the disposition of the beaver reserves on which family hunting grounds are located, the dynamics and organization of subsistence activities, the role of Cree tallymen, or the operating seasons or income-security program for Cree hunters and trappers. The system of Cree traplines on which operating activities are traditionally carried out is supported by a governance mechanism recognized under the JBNQA. However, as the agencies responsible for governance were not consulted, their views on the impacts on the traditional activity management system are not known. Given the importance of this matter, FRP-S considers inadequate the proponent's description of the issues raised concerning the management of traditional activities and of the lifestyle supported by this system.

Moreover, the regional development assessment—which the proponent considers positive—only deals with the permanent road that will provide mining exploration companies with improved access over the medium and long term. FRP-S believes that the proponent's analysis lacks rigour and that the positive impact on regional development has not been proven at all.

The CRÉBJ presented its various mandates for territorial development through the implementation of the CRRNTBJ, the production of a regional integrated natural resources and territorial development plan, and its five-year development plan for 2010–2015. FRP-S notes that, although the GCC(EI) did not present a vision for territorial development at the public hearings, it did publish a document expressing its vision of the Plan Nord in 2011. FRP-S also notes that a common vision among occupants of the territory for territorial and resource use development and planning has yet to be defined, although all stakeholders recognize the importance of working together. As governance is a highly complex matter, FRP-S believes that the proponent should consult with the stakeholders concerned. FRP-S cannot assess the proponent's sensitivity to local realities in this regard. The proponent has not described the agencies that manage the territory or assessed the project's effects on their management of traditional and economic activities or on the social services provided. However, the submissions by the CRÉBJ, the Council of the Cree Nation of Mistissini and the CBHSSJB make it clear that those agencies care a great deal about territorial organization and that, as far as the last two are concerned, the project does not jibe with their vision of good stewardship. While FRP-S is not in a position to evaluate the effect of the project on the agencies involved in land management, it notes that some have expressed fear of those effects. FRP-S can

only hope that the principal stakeholders eventually develop a common vision of territorial development that reconciles opinions on the future direction of the territory, especially given the accelerating development of mineral resources on JBNQA territory.

### *Access*

The proponent believes that the project's impact on access to the land and to resources will be positive. However, FRP-S notes significant omissions from Strateco's analysis of the potential impacts of the permanent road on sustainable resources and land management, as well as on governance (see above). FRP-S assumes that these questions will be examined in greater depth in the assessment of the MTQ's project to extend Route 167 North. Opening up the territory could, in fact, have significant positive and negative impacts on territorial and community organization via its economic benefits, other effects on quality of life, and the harmonization of land use and development. While improved access may seem positive *a priori*, it could turn out to be negative if planning is inadequate.

## **6.8 SOCIAL AND CULTURAL ISSUES**

The description of social and cultural conditions and the analysis by FRP-S are both based on information submitted by the proponent. Where necessary, some information taken from the same sources was updated to complement the description of the communities involved.

### **6.8.1 Current conditions**

#### *Demographics and education*

The two communities located closest to the Matoush project site are the Cree Community of Mistissini and the Town of Chibougamau. Like James Bay other Cree communities, Mistissini has experienced significant demographic change in recent decades. Next to the Cree Nation of Chisasibi, Mistissini has the largest population, with 2,897 members as of 2009. More than half the population is 30 years of age or under, with a median age of 23.8. Cree is the most commonly spoken language (99.7%), followed by English (96.7%). One-third of the labour force (aged 15–64) speaks French (CLMS, 2009) and 83% of the community's members speak Cree at home.

According to Statistics Canada (2006), the education levels of Mistissini's population 15 years and over are as follows:

- high school diploma or equivalent (10%)
- apprenticeship or trade school certificate or diploma (11%)
- college certificate or diploma (14%)
- university certificate, diploma or degree (7%)
- no certificate, diploma or degree (59%)

The Town of Chibougamau is part of the MBJ and has a population of 7,576. The median age of the population was 38 in 2006. A total of 96.6% of the population have French as their first language and 23.1% of the population speak some English and French (Census of Canada, 2006). According to Statistics Canada (2006), the education levels of the population 15 years and over are as follows:

- high school diploma or the equivalent (20%)
- apprenticeship or trade school certificate or diploma (23%)
- college certificate or diploma (16%)
- university certificate, diploma or degree (12%)
- no certificate, diploma or degree (29%)

#### *Health and social services*

A local community service centre (CLSC) managed by the Conseil cri de santé et des services sociaux de la Baie-James (CBHSSJB) serves Mistissini and the other interior communities of Waswanipi, Ouje-Bougoumou and Nemaska. Various social and health services are also available in Mistissini, such as the Centre de soins et de services sociaux pour jeunes en difficulté, the new medical clinic, the Multi-Service Centre (psychological support), the municipal police force, the ambulance service and judicial services.

The Centre régional de santé et services sociaux de la Baie-James (CRSSS) is located in Chibougamau and dispenses health and social services to the residents of the Nord du Québec region. Other social services also available in Chibougamau include the Centre jeunesse du Saguenay, the CLSC, the regional ambulance service, the fire department, judicial services and emergency measures.



### *Health indicators*

Weight and nutrition continue to be issues for the Cree communities—and Mistissini is no exception. In 2001, 54% of adults in the community were obese; obesity is also an issue for children. The number of cases of diabetes is also high; in 2006, nearly 20% of all Mistissini adults had been diagnosed with diabetes. Regarding tobacco use, while there are no specific data for the Mistissini community, in 2003, for all the Cree communities, nearly 34% of the population aged 12 years and older smoked tobacco on a daily basis (in comparison, the proportion of daily smokers for the rest of Quebec was 22%). However, most Cree smokers are light smokers, which is substantially different from the rest of the province. There are fewer drinkers in Cree communities than in the rest of Quebec, but those who do drink tend to binge (i.e., drink to excess on a single occasion). The proponent did not present any information on health indicators for the population of Chibougamau.

### *Historical or archeological heritage*

An inventory of sites of cultural, historical or archaeological interest was taken in 2008. From the information gathered during the inventory study, five zones were selected for site characterization. No sites of heritage value were identified from the areas explored.

## **6.8.2 Opinion of proponent**

The proponent assessed the impact of its project on the community's quality of life based on the subcomponents listed below.

### *Worker absence from family life*

The effect of lengthy worker absence on family life is considered a negative impact, but of minor significance. This assessment is justified by the fact that very little concern was shown in consultations with the Mistissini and Chibougamau communities. No mitigation measures are planned.

### *Social, cultural and community life enhancement*

The proponent considers the project's impact on social, cultural and community life enhancement to be positive, justifying this assessment by the fact that its financial contributions to various projects and activities through donations and sponsorships will help communities implement projects to improve social, cultural and community quality of life. No mitigation measures are planned.

### *Risk perception*

In its impact study, the proponent noted that several questions had been raised about the risk of environmental contamination or of a radioactive accident and stated that it is actively working to reassure the communities concerned. In response to a request for additional information from FRP-S, the proponent listed the fears raised during pre-consultation activities and interviews. These included contamination of the environment by dust, contamination of water, yellowcake transport accident risk during the mining phase, and contamination of the environment by radon. The proponent noted that mitigation measures had been implemented, such as the publication of six information bulletins in *The Nation* (magazine) and *La Sentinelle* (newspaper), to reduce the level of stress related to fear of contamination. The proponent plans to implement safety measures sufficient to reassure workers and neighbouring communities. The mitigation measures planned to minimize the effects related to worker concerns are protective measures for workers, environmental monitoring programs, daily inspections, worker training, and employee and community communication programs.

### *Alcohol consumption*

In response to a request by FRP-S for additional information concerning the proponent's policy on alcohol consumption, the proponent stated that the Matoush camp would be alcohol-free. The camp's general rules stipulate that no person shall attempt to bring in, have in his/her possession, be under the influence of, drink, distribute, sell or trade alcohol or prohibited drugs at the site. The disciplinary measure for non-compliance will be immediate expulsion from the site.

### *Working conditions*

In response to a request by FRP-S for additional information concerning the proponent's policy or program on accommodating cultural practices, the proponent stated that requests for accommodation would be analyzed on an individual basis and every attempt would be made to give a positive response to each request, depending on its content and context.

### *General quality of life*

Generally, the proponent was of the opinion that the Matoush project will positively influence the quality of life and the cultural context of the Mistissini and Chibougamau communities. The only residual negative impacts relate to worker absence from family life and the stress over fear of

environmental contamination or of a radioactive accident. Both residual negative impacts are considered minor.

### **6.8.3 Opinion of participants**

Participants in the public hearings raised concerns about several cultural context or quality of life components.

#### *Worker absence from family life*

Given the family issues resulting from lengthy absence, the CBHSSJB (M08) was of the view that the proponent should show that it is considering suggestions from the Cree concerning policies and services offered at the camp. For example, it felt that the proponent should provide Cree workers with recreational amenities and computers so that they could keep in touch with their families. In its brief, the Cree Nation of Mistissini (M07) stressed the lack of depth in the impact assessment of worker absence from family life and stated that the proponent should have taken divorce rates, substance abuse and problem gambling into account.

#### *Alcohol consumption*

The CBHSSJB noted in its submission that alcohol consumption is considered one of the most serious issues in Cree communities. The CBHSSJB received positive comments from several Cree members following the experience at the Troilus mine, where a policy prohibiting the sale of alcohol was in force. For the benefit of Cree workers' health, the CBHSSJB recommended that drugs be prohibited at the camp and that no alcohol be sold on the site. Therefore, it supports the proponent's policy.

#### *Risk perception*

Concerns over risk perception were raised by a number of participants, mainly in Mistissini. According to the Chief of Mistissini, because the proponent has not raised public awareness of the inherent risks of its project, it has not managed to gain people's trust. For a number of intervenors present at the public hearings, the fear remains. Still, both a participant from Chibougamau and the CRÉBJ were reassured by the planned regulation measures and the expertise of oversight agencies.

### *Cree culture*

The CBHSSJB believes that the proponent has not described Cree culture adequately. The Cree lifestyle (or traditional way of life) includes spiritual (e.g., self-esteem), emotional (e.g., stress, anxiety, fear), physical (e.g., proper diet, exercise, weight control) and mental (e.g., intellectual thought, knowledge, personal self-discipline) health. The proponent has not taken Cree spirituality into account and has examined the impacts on emotional, psychological and physical health separately, contrary to the holistic nature of the Cree vision.

Three young participants (V03) also stated that the project (and, more generally, land development) represents, in their view, a threat to their tradition and culture. Participants (V01, V02, V03, V04) in both Mistissini and Chibougamau also expressed their attachment to the land and the fact that the project appears incompatible with fundamental Cree values.

### *Social and health services*

The CBHSSJB talked about the pressure that the project could exert on the services provided, calling for employees' medicals to be conducted in Cree Health Board (CHB) clinics. It also noted that, if those medicals are not conducted in CHB clinics, the proponent should find doctors readily accessible to residents of the Cree communities.

## **6.8.4 Opinion of Review Panel**

In the view of FRP-S, the proponent's description of the social environment is rather general and does not give a proper account of the special character of that environment. While the proponent presents a profile of demographic conditions, education and social services, it is not clear from the description what the current social issues are in Mistissini and Chibougamau and what effect the project could have on them. It is crucial to establish ties with the different community agencies in order to obtain a better understanding of social, economic and cultural aspects closer to reality. The proponent should have made greater use of its consultations to further investigate social issues relating to its project. The proponent should also have demonstrated how representative the groups with which it met were of the population (e.g., youth, women, seniors) so that FRP-S could evaluate the basis of the proponent's assessment. FRP-S believes that it is important for the proponent to understand the issues facing the various groups. As presented, the proponent's assessment of the social impacts is, for the most part, superficial and does not represent the actual issues.

### *Worker absence from family life*

Distance is a significant constraint for workers who are trying to balance work and family life. Strateco describes this impact as being of low significance as very little concern was shown by local populations. However, like other mining regions, this type of problem has been observed at the Troilus mine near Mistissini. According to a study on the implementation of the agreement between the Troilus mine and the Cree Nation of Mistissini (2008), half the Cree workers believed that working at the mine had a negative impact on their family life and that the impact was even greater for those with young children. The effect mentioned most often was the fatigue felt by wives who had to remain alone with the children. The study reported that marital problems for some workers led to drug and alcohol abuse. Note, however, that according to the study, 15% of the Cree workers interviewed found that working at the Troilus mine had a positive effect on their family life as it provided them with an income to meet their family's needs and made them feel that they were setting a good example for their children. FRP-S believes that the effect of worker absence from family life—which could be for as long as six months of the year—may have been underestimated by the proponent.

While commending the proponent's policy prohibiting alcohol and drugs at the Matoush camp and its intention to consider any requests for accommodation, FRP-S notes that the proponent should make its commitment official and cooperate with other community organizations to explore forms of accommodation that could alleviate the psychosocial burden on workers and their families. Such measures could take different forms, such as providing communication devices for workers or arranging work/leave rotations.

### *Social and health services*

The proponent stated in its responses to COFEX's requests for additional information that it had developed agreements with service centres to prevent service delivery delays, but because no details were provided on these agreements, FRP-S cannot assess the proponent's commitment or the type of health or social services to be delivered. It does, however, note the fears expressed by the CBHSSJB concerning the pressure that the project could exert on service delivery in the Mistissini community.

### *Social, cultural and community life enhancement*

As was noted by some intervenors, the special nature of the Cree identity and their values, lifestyle and attachment to the land were not investigated by the proponent. FRP-S also found that the

proponent's assessment of social, cultural and community life was superficial. The proponent, for its part, believes that its contributions to various projects and activities through donations and sponsorships will be beneficial. However, because little information is available on the proponent's financial contributions to date, FRP-S cannot easily determine their positive impacts on the social, cultural and community life of the Cree. At the very least, the proponent has failed to demonstrate convincingly its positive assessment.

FRP-S therefore encourages the proponent, when planning funding for community projects, to support traditional activities relating to the Cree identity and to discuss contributions with the Council of the Cree Nation of Mistissini and local stakeholders.

### *Risk perception*

In light of the results of the public hearing held in Mistissini, it appears that fear of environmental contamination and of a radioactive accident has not dissipated, despite the information provided by the proponent. FRP-S wonders whether the fear expressed by some participants is proof of the failure of the proponent's efforts thus far to inform the public, or the outcome of a reflection based on the information available on the project and on the impacts associated with uranium mining or use.

At present, FRP-S doubts that the mitigation measures are sufficient to deal with the issue. The proponent notes in the impact study that an employee and community communication program is planned. However, subsequent to the public hearings, FRP-S finds that mistrust of the proponent persists and that some intervenors still have fears concerning the project.

**Recommendation 11: FRP-S recommends that the Federal Administrator add to the conditions for approval a follow-up program to enable the proponent to verify whether the community's risk perception has changed in order to identify the key factors that determine those perceptions and to adjust its communication program accordingly.**

## **6.9 ECONOMIC BENEFITS**

The description of economic conditions and the analysis by FRP-S are based on information presented by the proponent. Where necessary, some information taken from the same sources was updated or added to complement the description of the communities involved.

### **6.9.1 Current conditions**

Sources of income have changed considerably for the Cree community since the 1970s. In 1971, 32% of income was from salaries and 61% was from government aid. In 2006, the situation was reversed: income from salaries was 77% and government assistance represented only 21%. The average Cree income in 2006 was \$21,984 and, as of 2009, Cree communities still suffered from high unemployment (15.1%) when compared with the provincial average (7%). A number of businesses were established in the 1970s, primarily in the construction, transport, service and, more recently, tourism and community service industries. The Mistissini community has more than 40 businesses within its limits. In 2006, the activity level for the Mistissini community was 77.1% and the unemployment rate 18.9%. Economic activity is primarily in the retail and service, forestry, trapping, tourism, outfitters, construction and transport industries. In 2006, the proportion of Mistissini's labour force working in the primary sector was 18.9%. According to the *Cree Labour Market Survey* (2009), workers in the mining and oil and gas extraction sector represented 0.8% of the labour force working in Mistissini.

Like the MBJ, the Town of Chibougamau has witnessed changes to its economy over the last 10 years. In 1996, 17.3% of Chibougamau's labour force worked in primary industry; this number gradually decreased to 12% in 2006 (1996 and 2006 Census, Statistics Canada). The economy diversified to benefit tertiary industry (e.g., retail, hotels, restaurants, education, health care), which is now the primary economic driver. In 2006, Chibougamau had a labour force participation rate of 73.1% and an unemployment rate of 9.5%, with a median household income of \$28,037.

### **6.9.2 Opinion of proponent**

The proponent plans to invest \$60 million in the underground exploration phase. It believes that the project will generate important economic benefits for the region as well as on a provincial and national scale, and that positive impacts will be felt in terms of job creation.

Funding for the Matoush project will enable the hiring of 180 people for the underground exploration phase and 300 people for a future mining phase. For the underground exploration phase, Strateco's objective is to have a crew with a 15% composition of Cree workers; if operations move to the mining phase, that percentage will increase to 25%. Because the region has many people with mining expertise, the proponent plans to fill several positions with Cree and non-First Nations workers from the region. According to statistics from the Association minière du Québec, two indirect jobs will be created for each direct job. The proponent asserts that its project could limit job losses from the shutdown of mines in the region.

In the proponent's view, the expertise acquired by the Matoush project workers will be a long-term benefit for the region and for the whole province of Quebec. With the resumption of exploration activities, the mining industry must now acquire expertise that will lead its uranium exploration and mining projects to success. By offering training to its workers, the proponent will contribute to the creation of that expertise. The knowledge and competencies acquired by the Cree and other workers from the James Bay region will enable them to contribute to future uranium projects. This skills enhancement and workers' salaries will also help to increase the standard of living for workers and their families—another positive, long-term effect. No mitigation measures are planned, but measures will be applied to reach the objectives (e.g., Strateco will offer training according to the different types of work to be done and, for equal competence and qualifications, Strateco will favour the hiring of Cree or local labour).

### **6.9.3 Opinion of participants**

A number of participants, especially in Mistissini (V01, V03), requested details on how the proponent plans to comply with and achieve its objectives concerning employment, training and economic benefits.

In the opinion of the CBHSSJB (M08), training should be developed in collaboration with the Cree School Board and Cree Human Resources Development (CHRD), and the proponent should ensure that workers from the Troilus mine are able to work on Strateco's project. Also, although increased worker income is generally associated with improved health, the sudden increase in income may affect some individuals adversely, depending on how they then spend the extra money (e.g., some will increase their alcohol and junk food consumption). For these reasons, the CHB and the Cree Nation of Mistissini (M07) expect that they will have to develop programs to help clients with budget management and to provide advice on saving money. In its submission, the Cree Nation of Mistissini also expressed concern over the lack of detail provided by the proponent on how it planned to reduce constraints on the hiring of Cree workers and the awarding of contracts. It was also noted that human resources and support personnel should be provided at the camp site in order to retain the number of Cree workers and thereby meet the 15% hiring goal.

The CRÉBJ (M10) views the Matoush project as an opportunity to establish a centre of expertise and information that would include a learning component on uranium and other minerals in the region. It also suggests that a committee be established to maximize the economic benefits, with an obligation to achieve results.



#### **6.9.4 Opinion of Review Panel**

In the opinion of FRP-S, the appraisal of economic benefits for the receiving community is incomplete. FRP-S cannot determine whether the effects of the project will benefit the economic stakeholders of the region or how the project will contribute to regional economic growth.

The proponent estimates that a total of 180 permanent jobs will be created during the exploration phase—a total of 40 by Strateco Resources and 140 by various contractors. The principal mining contractor, CMAC-THYSSEN, is a joint enterprise composed of a Saskatoon-based company and a company based in Quebec City. It is expected to supply about half of the employees at the site. Strateco's decision was based on the contractor's expertise in uranium, which is currently difficult to find in Quebec. Moreover, Strateco intends to give CMAC-THYSSEN the job of providing training to regional personnel, who could possibly work in the exploration phase and, eventually, if applicable, in the mining phase. However, there is nothing in the impact study to require contractors to hire a certain percentage of workers who are Cree or from the region, and FRP-S has received no information on a local hiring quota for the project. Based on this information, FRP-S can only conclude that the proponent is relying on its contractor's good will.

**Recommendation 12: The proponent should set local hiring objectives with its contractors.**

The hiring objective for Cree workers announced by the proponent is 15% of 180, or approximately 27 workers. FRP-S concurs with some participants who doubt that the proponent can achieve that objective, especially because it has not considered the hiring constraints that the Cree could face and because little information is available on the training programs that will be introduced. First, the proponent should have provided a human resources plan detailing the number of positions, titles, requirements and qualifications for each; in doing so, hiring criteria could have been established and communicated to the communities of Mistissini and Chibougamau. Second, the proponent should have made more concrete commitments to the local institutions to assess local training needs. Without this information, the Cree cannot assess the competencies that the local labour force must acquire in order to meet the hiring criteria and apply to available federal programs.

So that the community can prepare for the project, Strateco Resources should provide the CHRD with a profile of its labour needs along with a description of the training to be dispensed by the company or its contractors. The proponent should also contact CHRD to review its strategy for advertising positions in order to raise its visibility in the Mistissini community. The proponent mentioned that it had met with the CHRD only once—not enough, in the view of FRP-S, which encourages the parties to talk to each other to ensure that training and hiring objectives are met.

In response to a request by FRP-S for additional information, the proponent indicated that its Cree hiring objective was based on current practices within Canadian industry and on regional conditions. Most of the examples cited refer to agreements between the First Nations and mining companies. For example, the impacts and benefits agreement between the Troilus mine and Mistissini set a Cree hiring objective of 25%. This target was achieved during the early years of operations (about 75 Cree workers between 1997 and 2001) but fell to half a few years later (36 Cree workers in 2007), mainly due to labour market competition at the time. An exodus of workers from the mine began in 2002, with workers leaving first for the Eastmain-1 and then for the Eastmain-1-A and Rupert diversion projects. While no project of comparable size is planned for the next few years, FRP-S believes that the current mining boom in the area could make conditions just as competitive.

FRP-S also wonders whether the Cree will be as attracted to work in an underground ramp project as in an open-pit mine such as Troilus. Moreover, the Matoush project has some distinctive features owing to the nature of the ore being explored, including the risk of exposure to radiological COPC. Low interest by the Cree in the project owing to the exploration method and the risk of exposure could make the hiring of Cree workers difficult. However, the proponent did not investigate these aspects.

As a result, FRP-S is not at all certain that the proponent will be able to meet its Cree hiring objective for the project. It hopes that those concerned will find a way to work together to optimize the hiring of Cree and residents of the region.

**Recommendation 13: In the opinion of FRP-S, in order to maximize the hiring of Cree and residents of the region, the proponent and its contractors should provide local stakeholders with a description of the human resources needed for the project—specifying the number of positions to be filled and the requirements and qualifications for each—so that the community is aware of the hiring criteria.**

The proponent also noted that Strateco's human resources department was responsible for the integration of employees in a fair and equitable manner for all workers. In its assessment, FRP-S noted that the proponent was not sufficiently committed to this aspect. From the review of the implementation of the Troilus agreement, one factor that contributed to the successful integration of Cree workers was the presence of a Cree employment coordinator to hire and support workers, inform them of workplace regulations, prevent and reduce conflict, and promote training. The Troilus experience also established that language is another important workplace issue; FRP-S fears that the proponent has not taken this into account. Although all documents are published in English and

French, the proponent has not paid attention to the potential challenges of a mainly Francophone workplace. While Cree workers speak English, Cree is spoken in the home and few Cree workers are comfortable in French, especially where technical terms are concerned. The proponent states only that supervisors will be required to have, as a minimum, a basic knowledge of English and that workers will be responsible for ensuring that they understand their supervisors' instructions. This approach fails to consider the difficulties that this situation may pose for Cree workers. Findings from the Troilus study indicate that language and communication constitute one of the most important challenges facing mining companies and Cree workers. The proponent's dismissal of this issue is disconcerting. Moreover, although it is a known fact that fewer women than men work in the mining industry, the proponent has not demonstrated that it will take steps to encourage the hiring of women in the field. It simply states that all positions are open to both men and women. Such statements demonstrate the proponent's poor understanding on a practical level of the hiring of Cree workers, barriers to female employment, and the various difficulties that Cree workers will face in their daily work environment.

**Recommendation 14: According to FRP-S, the proponent should establish a code of conduct to avoid discrimination at the camp and should offer a cultural awareness workshop to reduce conflict and help workers understand the cultural differences between Cree and non-Cree. FRP-S believes that the proponent should consider adding a Cree employment coordinator to its team to hire and support workers. The coordinator could also help the proponent manage issues related to language and female employment as part of the project.**

According to FRP-S, the project could conceivably bring back jobs to workers who once worked in the region's mines and that mining could once again become a source of employment for the region. Moreover, according to the study conducted for the Comité sectoriel de main-d'œuvre de l'industrie des mines by the James Bay Joint Action Mining Committee, entitled *Estimation des besoins de main-d'œuvre du secteur minier au Québec 2010–2020*, over the next few years, "44% of the labour requirements will be for the Nord du Québec (NDQ) region. Over the next 10 years, needs in the NDQ will account for 58% of labour requirements in all of Quebec." The study notes, however, that between 2011 and 2015, although 44% of all labour requirements (2,486 jobs) will be for the NDQ region, only 8% of new mining industry workers will come from the region (452 jobs).

While FRP-S accepts that the mining industry has an enormous labour requirement and understands the need to draw on workers from outside the NDQ region, it believes that NDQ communities and towns may derive little economic benefit in terms of household expenditures if few

of the workers come from the immediate area and those from outside the region are only present for short stays between their places of residence and work.

Moreover, the likelihood of Cree suppliers listed in the impact study obtaining contracts for the Matoush project cannot be established from those lists. The proponent should have instead provided a list of goods and services required and then submitted this list to the local economic stakeholders to enable them to position themselves to meet the proponent's needs. The tables summarizing the financial investments made between 2007 and 2010, presented in response to the FRP-S' request for additional information, contain several errors and cannot be used to estimate the future economic benefits to the region. Currently, the positive effect of the project on Cree businesses has not been demonstrated in a convincing manner. However, FRP-S notes with interest that the proponent is committed to establishing a First Nations and James Bay region contractor support program before the project reaches the mining phase.

## 7 ENVIRONMENTAL EFFECTS ON PROJECT

According to the CEAA's definition of "environmental effect", any change to the project that may be caused by the environment shall be taken into account in determining the environmental effects. Thus, in the case of the Matoush advanced exploration project, the proponent is required to examine the environmental effects on the project in addition to assessing the effects of the project on the environment.

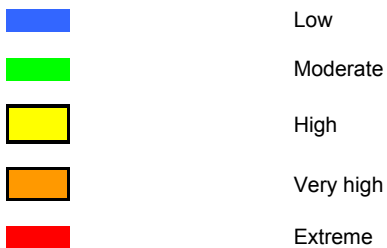
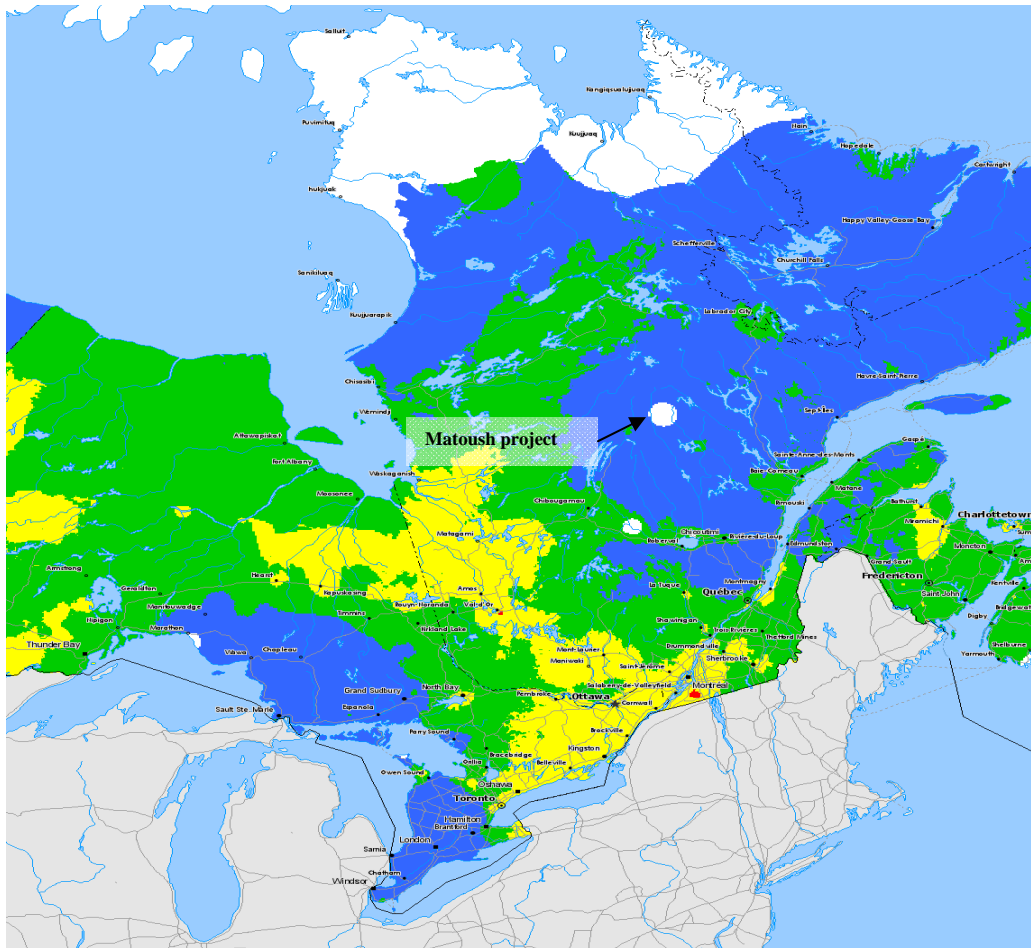
From the analyses provided by the proponent, the environmental effects on the project relate primarily to risks associated with heavy precipitation and forest fires. In the impact study, an exploration ramp stability assessment was also proposed in relation to the amplitude of seismic activities predicted for the region.

In order to estimate the recurrence periods of heavy precipitation on the site, the proponent used data from four weather stations (Nitchequon, Gagnon Airport, Chibougamau-Chapais Airport and La Grande Rivière Airport). For a 24-hour period, a 100-year event at the Matoush site is assessed at 85 mm. For site infrastructure design purposes, however, a 100-year event of 95.2 mm—the highest value of the four stations selected—was used.

In the regional study zone, the forest fire risk assessment, based on climate conditions and vegetation type, shows that the area affected by the proponent's work is located in a low-moderate risk zone (see Map 4, from Natural Resources Canada's *Atlas of Canada*).

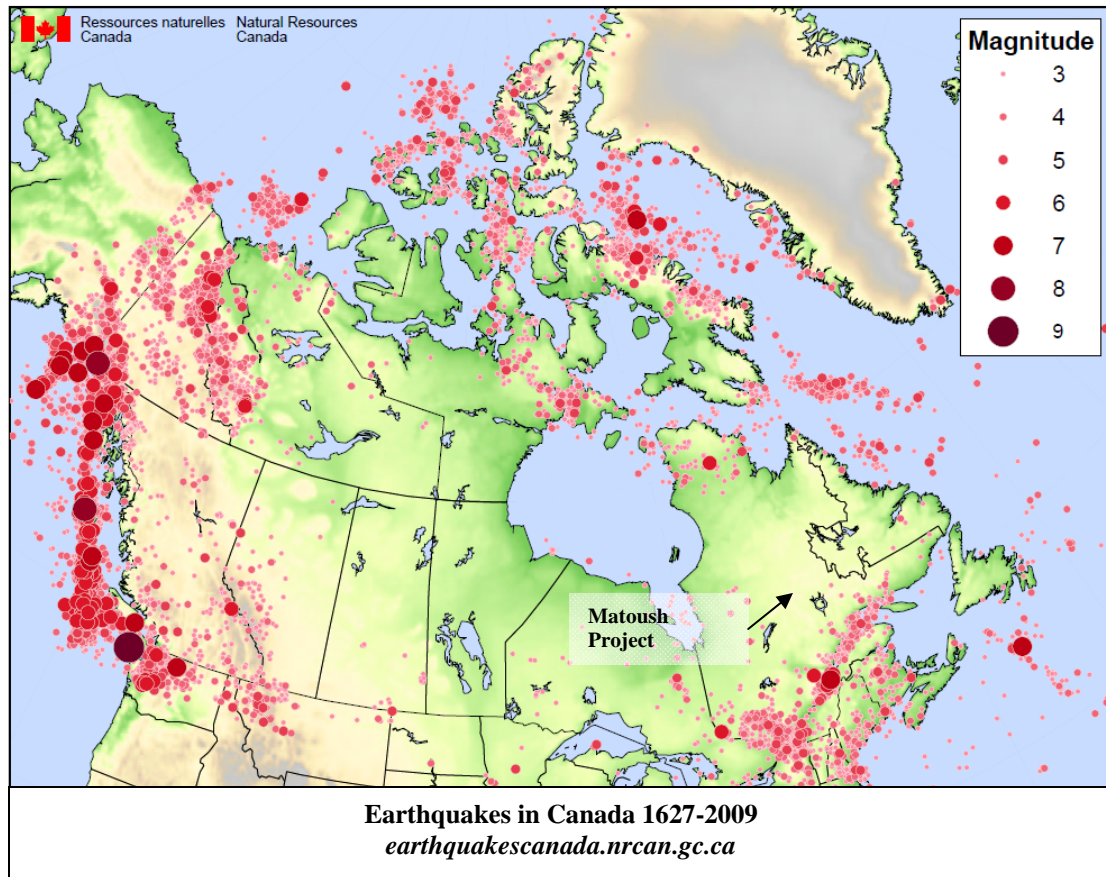
With respect to seismic activity, the Matoush project is located in a low-seismic-activity zone (see Map 5). Based on data from Natural Resources Canada, the proponent calculated the peak ground acceleration (PGA) for 100-, 476-, 1,000- and 2,475-year events. The results obtained were 0.007 g, 0.021 g, 0.035 g and 0.059 g respectively.

#### Map 4. Forest fire risk assessment



Source: Atlas of Canada, NRCAN 2009

## Map 5. Seismic activity in Canada



### 7.1 OPINION OF PROPONENT

With respect to heavy precipitation, flooding may occur if a storm larger than a 100-year event occurs. In the additional information filed with FRP-S, the proponent indicates that although extreme events may occur near the Matoush project, they are not likely to be outside the range of event values chosen to calculate the probable maximum rainfall. Water collection and treatment infrastructure is designed to handle to a 100-year event, and soil retention structures installed along the access roads will mitigate the potential environmental effects of extreme climatic events.

With respect to potential forest fires, the proponent has established a risk management program that includes a fire and explosion risk analysis. Emergency measures derived from this risk include, for example, fire drills and worker training. Moreover, development of the future site involves, according to Strateco, moving the fuel farm further away from the workers' camp to reduce the consequences of any potential explosions. Regarding the forest fire risk, the proponent notes that the site is almost

completely surrounded by water and heavy equipment could quickly create a barrier to limit the progress of any fire.

Strateco has conducted preliminary analyses of underground stability and the stability of pillars. It has concluded that the potential instability of the rock masses is structurally dependent primarily on the lithological units and on the depth considered by the study. The probability of failure of the crown pillar over the ramp is very low, except where the crown pillar presents a thickness less than twice the excavation span and in the so-called "argillaceous fault" area.

According to a literature review covering 125 case studies of the effects of a seismic event on tunnels having dimensions similar to those of the planned exploration ramp, no damage was observed for cases where tunnels were subjected to PGA of up to 0.190 g. As the strongest possible PGA at the Matoush project is estimated at 0.059 g for a 2,475-year event, the proponent is satisfied that any damage to the exploration ramp from potential seismic activity at the site would be insignificant. Table 7.1 summarizes the measures taken by the proponent to deal with environmental hazards.

**Table 7.1 Extreme events, effects and preventive measures**

Type of Event	Effects on Project	Preventive Measures
Forest fire	Interruption of activities Evacuation of personnel Loss of surface infrastructures Risk of explosion affecting hazardous product storage areas or fuel farms	Emergency measures program
Heavy precipitation	Basin overflow Loss of material	Design of sedimentation basins adjusted for maximum precipitation Use of geomembranes, as required Installation of berms along access roads beside bodies of water or installation of a temporary bridge if risk of flooding is anticipated on a section of the road
Earthquake	No significant effect or damage anticipated on the project	N/A

## **7.2 OPINION OF PUBLIC**

The Réseau québécois des groupes écologistes (M02) states that climate change will produce extremes of temperature and heavy precipitation in Quebec. In that organization's view, it is therefore essential to take a precautionary approach in the design of projects and the assessment of their impacts.

Because the region often has forest fires—most recently in the summer of 2010—CPAWS (M05) believes that the proponent's risk analysis and proposed action plan minimize the risk of forest fire. The organization is also concerned by the presence of a number of hazardous and explosive products on the site, which could exacerbate the effects of a potential fire.

## **7.3 OPINION OF REVIEW PANEL**

In light of the concerns expressed in the preceding sections dealing with water management, FRP-S is especially interested in the proponent's assessment of probable maximum precipitation (PMP) and the ability of the water collection and treatment infrastructure to stand up to extreme weather events. Moreover, although the site often receives significantly higher precipitation than the regional stations, data collected at the site in 2008—considered too limited by the proponent—could not be used to estimate PMP at the Matoush site. While the proponent's assessment (based on the highest value observed at the Chibougamau-Chapais station) appears reasonable, it cannot be called conservative given the climate variations observed within the region and the distance between the station in question and the Matoush site.

Moreover, FRP-S notes that the possibility of increased frequency of extreme events associated with climate change suggests that the reliability of predictions based on past data is questionable. The climate change issue introduces uncertainty concerning the probability of drought conditions, heavy rainfall and storms, which must be reflected in the proposed projections and analyses. Given the short duration of the project (4–5 years), the issue of climate change and its effects was not included in FRP-S analysis. However, in case a mine is opened, calculations on the probability of extreme climate events and maximum precipitation will have to be adjusted to take this new reality into account. On the issue of forest fire risk, FRP-S is satisfied that the response plan provides emergency measures in case of fire at the site but notes that the response plan in case of a nearby forest fire is unclear.



On the issue of ramp stability, FRP-S supports a recommendation by the CNSC that underground-level support methods be reviewed. Follow-up measures on this point are recommended above in section 11.

**Recommendation 15: As the site is located in a limited protection zone and the *Société de protection des forêts contre le feu* only responds selectively when people or property deemed essential to public safety are threatened by fire, and because the low commercial value of forests means that fire-fighting cannot be justified in every case, FRP-S recommends to the Federal Administrator and the CNSC that the proponent be required to include in the emergency measures plan a detailed response plan in case of forest fire, specifically to cover the evacuation of onsite personnel.**

Such a situation recently caused the proponent considerable concern, when a fire broke out in the summer of 2010 near the facilities at the Matoush site.

**Conclusion 5: FRP-S is satisfied that the effects of environmental conditions on the Matoush advanced exploration project are unlikely to cause significant effects as defined in the CEEA, especially if the proponent includes measures to manage the risk of forest fires.**

## 8 ACCIDENTS AND MALFUNCTIONS

To assess the risk of accidents and malfunctions likely to have an environmental impact, other than the risk of natural disasters discussed in section 7 and the ecotoxicological risks covered in sections 6.5 and 6.6, the proponent identified potential hazards associated with ongoing operations as well as the risk associated with these hazards.

The proponent evaluated probability of occurrence as well as impact severity to assess the risk (see Table 8.1) and determine necessary mitigation or precautionary measures.

**Table 8.1 Proponent’s risk assessment matrix**

Probability of Occurrence	Severity		
	Minor (1)	Significant or serious (2)	Severe (3)
Low, rare, very unlikely (1)	Negligible (1)	Negligible (2)	Acceptable (3)
Average, moderate, exceptional (2)	Negligible (2)	Moderate (4)	Substantial (6)
High, has already happened, could happen (3)	Acceptable (3)	Substantial (6)	Intolerable (9)

### 8.1 IDENTIFICATION AND ASSESSMENT OF INDUSTRIAL RISKS BY PROPONENT

The main accident risks associated with the Matoush underground exploration project, along with risk assessment findings, control measures and required actions, are summarized in Table 8.2.

**Table 8.2 Hazards identification and risk assessment**

ID	Description	Hazard	Consequences	Severity	Probability	Risk	Control Measure in Place	Required Action
<b>Transportation to and from site</b>								
TR-1	Delivery of petroleum products	Gas and oil spills	Soil and/or water contamination	2	2	4	Experience on winter roads in the region (good results). Spill kits on hand. Gas containers are heavy-duty.	Emergency measures program
TR-2	Delivery of hazardous materials (other than petroleum products)	Spill involving one or a combination of hazardous materials	Soil and/or water contamination	2	2	4	Materials will be shipped in heavy-duty containers. Incompatible materials will be shipped separately.	Emergency measures program
<b>Thermal power plant</b>								
PW 1	Operation of thermal power plant	Loss of containment of petroleum products, including diesel fuel, oil and lubricants Generation of NO <sub>x</sub> , SO <sub>x</sub> and carbon dioxide	Soil and/or water contamination Excessive air emissions	2	2	4	Generators will be installed on a concrete floor. Day tanks will be equipped with secondary spill containment sumps. The generators will be new or lightly used and a maintenance program will be put in place to ensure optimal performance and minimum emissions.	Operator training, follow-up and inspections
PW 2	Fire risk	Fire can release toxic fumes into the air and compromise the safety of stored liquids/products	Soil and water contamination	2	2	4	Fire suppression systems will be placed in the generator building. Petroleum storage tanks will be separated from generators.	Worker training and fire drills
<b>Site</b>								
AS-1	Fuel equipment and distribution station, waste oil storage, propane equipment	Fuel or oil spill	Soil and water contamination	2	2	4	Double-walled tanks. Secondary containment (>125% of largest recipient). Waste oils will be collected by a certified contractor and/or reused on site for heating. Drainage pits or oil traps will be available as required.	No action other than daily inspections

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ID	Description	Hazard	Consequences	Severity	Probability	Risk	Control Measure in Place	Required Action
<b>Site (suite)</b>								
AS-2	Storage and handling of hazardous materials (other than petroleum products)	Chemical or hazardous material spills	Soil and surface water contamination caused by spill during transportation, storage or handling of hazardous materials	2	2	4	Chemicals will be stored on pallets on concrete surfaces in a closed building, primarily the contaminated water treatment unit and the Strateco warehouse.	Inventory control
AS-3	Contractors' area (garage and warehouse)	Fuel, oil or lubricant spills	Soil and water contamination	2	1	2	Waste oil, lubricant, filter and other containers will be available, along with containers for the materials used to clean up spills (the containers will be stored in a secondary containment area).	No action other than daily inspections
AS-4	General activity	Disturbance to more sensitive elements in the environment Sediment in runoff could be released into nearby streams	Habitat loss and surface water contamination	3	1	3	Many controls in place to reduce amount of sediment in runoff. Clearing and stripping to be limited to what is strictly necessary.	No action other than runoff drainage system maintenance and environmental follow-up program
AS-5	Drinking water treatment system	Sodium hypochlorite spill	In the event of contact with surface water, the water would become toxic to fish	2	2	4	The drinking water treatment unit is compact and enclosed in a "container".	No action required
AS-7	Storage areas for water rock and special waste rock	Acid drainage and metals leaching from waste rock pads	Water contamination	2	2	4	Special waste rock pad includes a geomembrane. The "clean" waste rock pad consists of materials with limited permeability. The pads are surrounded by ditches that collect water, which may be subsequently treated, if required. The waste rock is neither acid generating, nor radioactive.	No action required

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ID	Description	Hazard	Consequences	Severity	Probability	Risk	Control Measure in Place	Required Action
<b>Site (continued)</b>								
AS-8	Explosives management and handling	Spill involving products containing explosives	Soil and water contamination	2	2	4	The regulations governing explosives will be followed and complied with. Explosives will be stored in the explosives magazine located 700 m from the camp and detonators will be stored in a separate location. Strateco shall return all unused or defective explosives to the supplier.	No action required
AS-9	Gas and diesel distribution	Fuel spill	Soil and water contamination	2	2	4	Refuelling shall be done only in the designated refuelling area, which has a concrete floor and a drainage pit.	Exercise care and have spill kit on hand
AS-10	Catch basins A and B	Release of sediment or contaminated water into the environment	Surface water contamination	2	1	3	The catch basins were designed for a 1:100-year event and can therefore easily accommodate normal conditions.	No action required
<b>Other</b>								
GEN -2	Surface traffic	Various types of vehicles and machinery share limited space on site, which may lead to accidents and fuel, hydraulic fluid or other losses	Localized soil and surface water contamination	2	2	4	Minimize traffic during inclement weather. Use dust suppressants (water) on access roads. Clean up spills immediately in accordance with established procedures.	Emergency measures program
GEN-3	Wildlife	Waste dispersed by bears or other wild animals	Risk of animal aggressiveness toward humans	1	2	2	Waste to be stored in closed containers prior to disposal at the landfill site.	No action required

An assessment of the risks associated with the water treatment plant for the ramp development project and catch basins was also submitted by Strateco. In this assessment, 214 sources of risk were identified in relation to the following project components:

- underground water line where it exits the ramp
- drain line from the special waste rock pad
- effluent discharge line from settling pond no. 2 to where it exits the ramp water treatment plant
- two storage ponds and two settling ponds
- process, instrumentation as well as mechanical and civil design

A detailed risk assessment resulted in recommendations for 66 of these risks, specifically in terms of employee training, monitoring, best practices and the implementation of appropriate safety measures.

With regard to risks associated with flooding during the underground work, the proponent indicated, in response to a request for additional information from FRP-S, that the results of the measurements of hydraulic conductivity and the geotechnical investigations suggested that water infiltration in the exploration ramp could be significant. Strateco noted that, in the event of significant water infiltration, cracks could be cemented to limit inflows and that it would conduct investigations depending on inflows encountered in the ramp. This issue and the issue of the stability of underground work were addressed in sections 6.3 and 7.1 on water quality and the environmental effects on the project.

Overall, the environmental risks associated with the hazards linked to the development of the Matoush underground exploration project were assessed by the proponent to be negligible to moderate. No significant risk necessitating a change to project planning or operations was identified, although a number of moderate risks (specifically the presence and use of petroleum products) will require sustained diligence during the performance of the work.

Other than the measures indicated above, Strateco also intends to put in place an environmental management program and to document procedures applicable to the identified hazards so as to minimize the environmental consequences of an industrial accident. In addition to its commitment to comply with applicable acts and regulations, Strateco submitted an environmental emergency program to the CNSC. This program details emergency response measures in the event of spills, fires and explosions. Emergency procedures are outlined, along with the composition and responsibilities of a public safety committee (comprising project officials) and the communications system put in place in the event of disasters or accidents.

## 8.2 OPINION OF PARTICIPANTS

The main concerns expressed by participants (M06, M08, M11) related to the control and prevention measures in place for managing spill-related risks, specifically the imperviousness and capacity of the waste rock and mine tailings catch basins to prevent environmental spills.

The CBHSSJB (M08) wanted to know whether the proponent had measures in place to prevent spills caused by road accidents, rather than just emergency measures. It also wanted to have a list of all the chemicals and hazardous products that would be used on site along with an indication of quantities and how such products would be safely transported, stored and handled on site.

In addition, the CBHSSJB noted that the proponent should meet with Cree stakeholders to coordinate emergency measures, set up appropriate methods of communication, and identify the responsibilities of the various stakeholders.

## 8.3 OPINION OF REVIEW PANEL

With regard to potential water infiltration during the construction of the underground ramp, FRP-S supports the CNSC's recommendation that better hydrogeological characterization is required to identify potential water inflow parameters. Follow-up measures in this regard are recommended in section 11.

After consultation with Environment Canada, FRP-S confirmed that, on the basis of information provided by the proponent, Strateco would not for the moment need to comply with the *Environmental Emergency Regulations*, given that the proponent does not currently have or manage a listed substance on site in a quantity that is equal to or greater than the minimum prescribed quantity (see Schedule 1 to the *Regulations*).

Although the proposed exploration project is not in itself a mine, given the type of ore and the concerns expressed by participants, FRP-S is of the opinion that the proponent should adopt an approach that would be similar to that outlined in the *Regulations*.

**Recommendation 16: FRP-S recommends that the Federal Administrator and the CNSC, in compliance with the advice issued by Environment Canada, require that the proponent revise its risk assessment along with potential accident scenarios and the**

**description of effects on the environment and the population, with special attention given to the following elements:**

- **determination of distances involved in accident scenarios involving propane (BLEVE, hose or pump leakage, taking into consideration time required to stop leak, the extent of the spill, and other issues)**
- **presence of a foam extinguishing system in the event of fuel fire in catch basins**
- **installation of gas detectors to detect gas leaks**
- **installation of a surveillance camera to ensure prompt response in the event of a spill or leak**
- **there is currently no indication that high-level gauges will be installed in the tanks to prevent overfilling (more than one high-level alarm gauge will be needed per tank; specifically, a high-level alarm gauge and a very-high-level alarm gauge, with some even recommending a third gauge)**
- **there is currently no indication that the propane tanks will be relocated to prevent the dispersion of propane in the ramp and minimize the risk of fire or explosions**

Strateco Resources and its contractors would do well to focus on spill prevention in addition to emergency measures. In this regard, a key element in the proponent's environmental management program should be a commitment to enhance personnel training and the effectiveness of emergency preparedness, ensuring continuous improvement by way of official emergency preparedness exercises. FRP-S also recommends that the proponent focus on providing employees with appropriate training to ensure they are equipped to handle various types of potential fires on site.

In addition, FRP-S is of the opinion that Strateco should strengthen its communications capacities with the public, specifically ensuring that nearby communities or their representatives are adequately informed in a timely manner in the event of adverse conditions or a spill that could impact land users.



**Recommendation 17: FRP-S supports the CBHSSJB's recommendation and recommends that the Federal Administrator and the CNSC require that the proponent meet as soon as possible with regional stakeholders to ensure the emergency measures plan is coordinated with local authorities and responsibilities are clearly defined so that local authorities are in a position to ensure the health and well-being of the local population.**

**Conclusion 6: FRP-S concludes that the potential accidents and malfunctions associated with the exploration project are not likely to cause significant adverse environmental effects, as defined under the CEAA, if the proponent applies all the measures specified in the environmental impact statement and related documents (including, for example, the measures proposed by Melis Engineering in its report to Strateco concerning the water treatment facility and catch basins for the underground ramp), as well as the environmental management and emergency response programs, so as to limit the probability of occurrence of hazards.**

## 9 CUMULATIVE EFFECTS

### 9.1 METHODOLOGY

As required in the directives to the proponent, the assessment of the effects of the Matoush exploration project must take into consideration potential cumulative effects on valued environmental components. To accomplish this, it must be determined whether the residual human and environmental impacts of the project—that is, impacts after the application of mitigation measures—are likely to interact with the impacts of other activities or projects under way in the same sector as well as those in the planning stage that have a high probability of being implemented.

On the basis of the directives and discussions with FRP-S during the environmental impact assessment, the cumulative effects assessment undertaken by the proponent of the Matoush underground ramp project should include, but not be limited to, the following environmental components:

- Cree land and resource use
- economic development, demographics and the social context within communities in the region

- impacts on archaeological heritage
- recreational tourism activities, including sport hunting and fishing
- vegetation, endangered wildlife and plant species, and species used for medicinal purposes
- water quality
- wildlife and wildlife habitat

For the cumulative effects assessment, the proponent identified projects within a 100-km radius of the site, with a planned completion date of five years as of the preparation of the impact statement. FRP-S updated the information on projects selected by the proponent (see Table 9.1 below).

**Table 9.1 Projects considered in the cumulative effects assessment**

Project	Distance from Matoush Camp	Description	Progress/Status
Project to upgrade winter road to four-season road (extension of Route 167-N)	The actual winter road is about 7 km west of the camp	Construction of a category 4 gravel road	In response to the directive issued by the Provincial Administrator in April 2010, an environmental impact statement was filed in December 2010 by the MTQ. This project was also subject to an environmental impact assessment under the CEAA ( <a href="http://www.ceaa.gc.ca/050/details-fra.cfm?evaluation=54435">www.ceaa.gc.ca/050/details-fra.cfm?evaluation=54435</a> )
Western Troy MacLeod Lake project	About 70 km west of the camp	Cu-Mo mining project	COMEV prepared a preliminary directive in January 2009. The project was subsequently subject to a technical feasibility study and the environmental impact assessment is currently under way.
Stornoway/SOQUEM Renard project	About 85 km north by northwest of the camp	Diamond mining project	Directive issued by the Provincial Administrator in June 2010. This project is also subject to an environmental impact assessment under the CEAA ( <a href="http://www.ceaa.gc.ca/050/details-fra.cfm?evaluation=55169">www.ceaa.gc.ca/050/details-fra.cfm?evaluation=55169</a> ).
Eastmain Resources Eastmain and Ruby Hill mine	About 35 km northwest of the camp	Mining exploration	Former gold mine operated between 1994 and 1995. Exploration drilling work in 2009 and planned for 2010. Boreholes drilled on Ruby Hill in 2008.
Albanel-Témiscamie-Otish park project	The closest boundaries with the proposed park are about 10 km south and east of the Matoush site	Creation of a biodiversity park consisting of more than 11,000 km <sup>2</sup>	In response to a directive issued by the Provincial Administrator in December 2003, an environmental impact statement was filed in March 2010 by the MDDEP (Ecological Heritage and Parks Branch).
Strateco Resources landfill site	500 m southwest of the camp	Landfill for kitchen waste and nonrecyclable domestic waste	Authorization received in 2007. Site operations began in 2008.

## **9.2 CUMULATIVE EFFECTS ASSESSMENT**

### **9.2.1 Opinion of proponent**

#### *Impacts on vegetation and wildlife*

According to the proponent, the combination of projects selected for this assessment could potentially increase the impact on vegetation as well as the loss or fragmentation of wildlife habitats. The cumulative effect in the case of the other mining projects is considered negligible given that these projects, with the exception of the four-season road project, are all located more than 35 km from the site and are either too few in number or too far away to have a noticeable impact. The proponent is of the opinion that if a cumulative effect were to occur, it would more likely involve a redistribution of wildlife than a reduction in the wildlife population.

#### *Impacts on water quality*

With regard to surface water and groundwater quality, the proponent considers that the environmental impact of the landfill will be marginally greater than the impact of the release of treated effluent into the lake. The proponent believes that no additional impact on surface water will result from the use of the landfill or the other mining projects in the region because the Matoush site is located at the head of the Otish Mountains watershed and the impact on surface water quality should be negligible at the confluence with the Camie River.

#### *Economic and social impacts*

The economic impacts resulting from the interaction between the Matoush project and the other projects are considered by the proponent to be positive. Given that each of the projects will employ local workers and services, the local and regional economies will benefit. At the same time, increased demand for local services could well overtax local resources. To minimize potential adverse effects on the Chibougamau, Chapais and Mistissini health and social services system, the proponent intends to establish agreements with these service centres to prevent overloading the system.

### **9.2.2 Opinion of participants**

The main comments from participants pertained to the choice of projects selected for the cumulative effects assessment. The participants noted that, in light of the region's mining potential, many companies were involved in smaller exploration projects and that a large number of uranium mining projects was likely to emerge in the region. MiningWatch Canada also noted that some related projects, such as the airstrip, should have been included in the cumulative effects assessment.

In addition, CPAWS believes that the cumulative impact on woodland caribou could well be greater than anticipated, specifically owing to the anthropogenic disturbance attributable to increased heavy traffic and air traffic in the vicinity of the site.

### **9.2.3 Opinion of Review Panel**

#### *Methodology*

FRP-S notes that the cumulative effects assessment presented by the proponent in the environmental impact statement is fairly basic, is short on details regarding the impacts of other projects examined as part of the assessment, and contains some fairly questionable comparisons, such as when the proponent compares the impact of mining effluent (inorganic) with that of potential runoff from the landfill (organic).

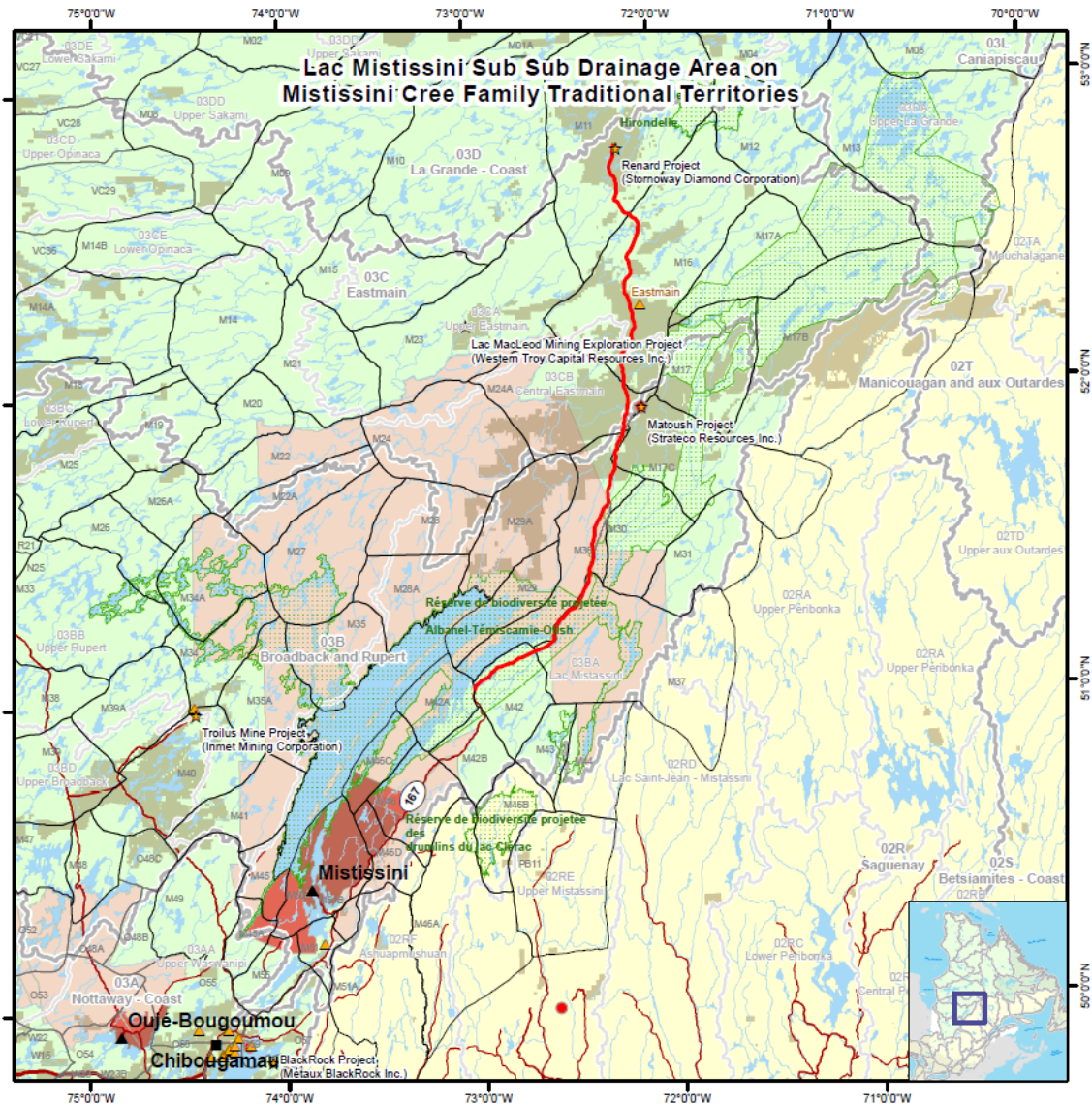
With regard to projects that must be considered in the cumulative effects assessment, FRP-S is of the opinion that, in light of comments from the public, the proponent should have taken into consideration other related projects it expects to undertake or has already undertaken (e.g., airstrip, borrow pits, sandpit operations). FRP-S should have included these related projects in the cumulative effects assessment on the same level as the other structures and activities that could have an effect on one or more of the valued environmental components. FRP-S is concerned about the lack of environmental data concerning these activities; this is more of a concern, however, in the case of other past and future mining projects in the region. The proponent did not seem to consider the impacts of these projects or, at the very least, did not seem to have made any effort in this regard. FRP-S did, however, consider certain other data, specifically in the context of its assessment of the social impacts of the Troilus project (see section 6.8).

As for Route 167-N (discussed below), the confusion that has reigned over the actual proponent of this project did not facilitate the review by FRP-S in terms of either the cumulative effects or the discussion on the scope of the Matoush exploration project.

*Opening access to the territory*

The proponent cannot be held responsible for activities beyond the scope of its responsibility, except if it contributes to significantly amplifying their impacts. In this context, can the proponent therefore be held responsible for contributing to opening access to the territory, which is the result of many historical, political and social factors? Although some participants are of the opinion that this project will contribute to opening up the territory, FRP-S believes that the Matoush project is more likely to contribute to the anthropogenic footprint on the territory than make a substantial contribution to opening access to the territory. The same applies to the permanent airstrip. However, the issue is quite different when it comes to Route 167-N. This road (see Map 6) could, in fact, open up a vast territory that is currently difficult to access (as noted by CPAWS) and thereby generate other effects—both positive and negative—such as impacts on Cree land and resource use, sport fishing, regional economic development, wildlife, the cultural and social context, and so forth. However, even if the Matoush exploration project contributes to traffic on Route 167-N, FRP-S is of the opinion that the best forum for discussing these issues is the environmental impact assessment of the Route 167-N rehabilitation project (to be undertaken by COMEX), along with the comprehensive study performed by federal authorities in accordance with the CEEA.

Map 6. Extension of Route 167-N and other activities



<ul style="list-style-type: none"> <li>★ Project Under Development</li> <li><b>Mining Sites - Dec 2010</b></li> <li>● Mine Sites</li> <li>▲ Mining Exploration</li> <li><b>Mining Titles - 10/12/05</b></li> <li>■ Mining Claims</li> <li><b>Water Survey of Canada</b></li> <li><b>Major Drainage Area</b></li> <li>02, St. Lawrence</li> <li>03, Northern Québec and Labrador</li> <li>Sub Drainage Area</li> <li>Sub Sub Drainage Area</li> </ul>	<ul style="list-style-type: none"> <li><b>Cree Traplines</b></li> <li>□ Other Communities</li> <li>□ Mistissini</li> <li><b>Category Lands</b></li> <li>■ Category IA</li> <li>■ Category IB</li> <li>■ Category II</li> <li>■ Protected Areas</li> <li>— Route 167 Extension</li> <li>— Winter Road</li> </ul>	<ul style="list-style-type: none"> <li>■ Towns</li> <li>▲ Cree Communities</li> <li>— Main Roads</li> <li>— Secondary Roads</li> <li>— MRN</li> <li>■ Waterbody</li> <li>— Watercourse</li> <li>□ Administrative Region</li> </ul>	<p>Projection: UTM Zone 18 Datum: NAD83</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>- Atlas of Canada, 1M National Framework Data, Hydrology – Drainage Areas, V5.0 (2008)</li> <li>- CRA, Cree Traplines (2005)</li> <li>- MDDP, Protected Areas (2010)</li> <li>- MNRF, BGDA 1M (2010)</li> <li>- MNRF, GESTIM Mining rights digital data [titles_10-12-05.zip - 32.kbp, 33.kbp], (December 2010)</li> <li>- MNRF, GESTIM Plus, Mining Sites, (December 2010)</li> <li>- MTQ, Route 167 Road Extension (2010)</li> </ul> <p>*Traplines should not be considered official.</p>
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### *Economic and social issues*

FRP-S acknowledges that the various development projects could actually improve the employment situation in the region, particularly if stakeholders carry out the measures needed to ensure training needs are met.

With regard to the potential overloading of the regional health and social services system, FRP-S encourages the proponent to establish agreements as soon as possible so as to ensure smooth communication and coordination with health authorities.

### *Vegetation and wildlife*

Regarding forest cover, wildlife and wildlife habitat, the land areas affected by the Matoush project are relatively limited and their ecological value is not particularly high. The project, as proposed, will therefore have a small environmental footprint. Furthermore, given the planned revegetation measures and the measures to limit borrow pit use and access road construction, FRP-S believes that the Matoush exploration project is not likely to cause significant cumulative effects on these components.

FRP-S agrees with CPAWS that the cumulative effects on woodland caribou should include, in addition to the assessment of habitat loss, an investigation into the effects attributable to anthropogenic disturbance. FRP-S notes that the assessment provided by the proponent does not reflect the importance that should be attributed to woodland caribou. Nonetheless, given the limited duration and scope of the Matoush exploration project, FRP-S is of the opinion that the cumulative effect of the project on woodland caribou could well be limited. FRP-S believes that if management measures are required in relation to woodland caribou, these measures fall under the jurisdiction of government authorities responsible for implementing land use plans and protection and rehabilitation measures for this species. This does not, however, prevent the proponent from participating in these activities. On the contrary, FRP-S strongly encourages the proponent to exercise prudence, be proactive and inquire with the MRNF about the types of monitoring measures to which it could contribute.

### *Water quality*

Although special attention must be given to water quality and this component has been the subject of mitigation and follow-up measures, FRP-S is of the opinion that because the project is at the head of the watershed—with no significant inflows from tributaries—there could be negative impacts on

the lake in winter if there is insufficient renewal and mixing of the waters. Furthermore, if the proponent allows effluents to be released as planned onto the ice surface in winter, there could be a cumulative impact if spring shock were to occur more than once. To prevent mining effluent from accumulating on the ice surface and potential successive ice shocks from contributing to a cumulative impact, FRP-S is of the opinion that the proponent should adjust its effluent outflow so that it discharges effluent into the water under the ice cover and into a water column that is deep enough to dilute the effluent (see recommendation above, section 6.3.4).

**Conclusion 7: FRP-S concludes that the residual impacts of the Matoush advanced exploration project are not likely to cause significant cumulative effects. In other words, FRP-S is of the opinion that the Matoush project's contribution to the impacts of other projects currently underway or that will be undertaken in the near future are not likely to be significant after the application of the mitigation measures and if the recommendations concerning effluent discharges are implemented.**

## 10 SUSTAINABILITY OF RENEWABLE RESOURCES

Under the *Canadian Environmental Assessment Act*, the capacity of renewable resources significantly affected by the project to meet present and future needs must be considered. The sustainability of resources is dependent on a range of ecological considerations, including:

- ecosystem integrity (its complexity, diversity, stability and resilience)
- resource production capacity
- ecosystem carrying capacity
- ecosystem assimilation capacity

The environmental assessment indicates that, among the renewable resources in the study area, only water quality could sustain significant impacts in connection with this project. However, water quality mitigation and follow-up measures have been proposed by the proponent and others are required by the authorities (specifically the CNSC) with a view to minimizing the environmental impacts of the project by maximizing the effectiveness of the proposed measures. As the effects of the project on water quality are likely to be controlled by the implementation of appropriate mitigation and follow-up measures, and given that these measures will be part of the CNSC's authorization conditions—which will take into consideration the analysis of alternatives and new risk assessment data—FRP-S believes that the sustainability of this environmental component is not likely to be significantly threatened as defined under the CEAA. However, it should be noted that if the



proponent relocates its drinking water source and draws water from the water table, the impact of the project on hydrogeological conditions could change. In such a case, FRP-S is of the opinion that adaptive management measures should be anticipated by the CNSC with the proponent, as specified in section 11 of this report.

Regarding the assessment of effects on the capacity of renewable resources to meet current and future needs, FRP-S has also considered the resource preservation objectives for the proposed ATO national park and the Alanel, Mistassini and Waconichi Lakes Wildlife Sanctuary and the fact that part of the Matoush project's ecological footprint is located in these areas. Although the ecological footprint of the Matoush exploration project remains relatively limited for the moment, the situation may well change should uranium mining be developed in the region. In such a case, special attention will have to be given to all potential effects of the project on the integrity of the various users of the ATO Park and the wildlife sanctuary so as to ensure resource sustainability.

Woodland caribou could have been considered in this assessment, given the important value placed on this species and its at-risk status. However, FRP-S is of the opinion that, given the short duration and limited environmental footprint of the Matoush exploration project, it is not likely to cause any significant cumulative effect on the woodland caribou population.

Despite the short duration of the project, the CNSC required the proponent to submit a restoration plan, which will be implemented if the underground exploration project does not result in an operations phase. In addition, given the characteristics of the project, the procedures for managing radioactive material likely to be handled during the exploration project have also been carefully reviewed by federal experts. FRP-S is confident that, with the restoration and control measures to be implemented by the proponent and monitored by the CNSC, the project is not likely to cause a short-, medium- or long-term radiological risk.

Finally, the financial resources to be invested by the proponent in the follow-up and comprehensive environmental characterization programs should contribute to enhancing the quality of the data on the biological environment. The objective would therefore be to enable the various stakeholders to better assess the capacity of renewable resources if mine development projects were to be carried out in the region, particularly on the Matoush project site.

**Conclusion 8: FRP-S is of the opinion that the Matoush exploration project will not lessen the capacity of renewable resources to meet the needs of current and future generations if the mitigation and follow-up measures proposed by the proponent, FRP-S and the CNSC are implemented.**

## 11 MONITORING AND FOLLOW-UP PROGRAMS

In addition to meeting its commitments with regard to the rules of good practice as stipulated in the environmental impact study, the proponent should put in place a monitoring and follow-up program for the Matoush underground exploration project so as to verify conformance of the work and to control the effects of the project on a certain number of valued ecosystem components.

### **11.1 MONITORING PROGRAM**

In the assessment of project impacts, various measures were proposed to mitigate the social and environmental repercussions of the project. The proponent intends to incorporate these measures, along with relevant conditions specified in future government authorizations, into the plans and specifications developed for use by contractors.

The proponent intends to have an environmental technician present on site at all times to ensure that contractors and subcontractors comply with Strateco Resources' environmental commitments and obligations. Any noncompliance shall be raised and recorded in the environmental monitoring report submitted to the project manager so that the manager can identify appropriate corrective measures.

The proponent will also set up an independent committee responsible for informing the local population of the activities underway at the site and forwarding questions and requests from the local population to Strateco Resources management with respect to the project and the protection of the environment. The committee will include local community members.

In addition to the measures put in place by the proponent, the CNSC could also play a role in monitoring the site and the work if it authorizes the Matoush advanced exploration project.

### **11.2 FOLLOW-UP PROGRAM**

The objective of the follow-up program is to monitor certain environmental components that could be affected by the project. Project follow-up verifies the accuracy of the assessment of certain impacts, particularly those where uncertainty remains, in addition to verifying the effectiveness of mitigation measures.

Included among the components subject to follow-up by the proponent are:

- air quality
- quality of surface water, groundwater and sediment, including inflows and effluent
- wildlife, plants and species at risk
- human health
- economic benefits

The proposed follow-up measures also include inspecting the physical integrity of the facilities that could have an environmental impact in the event of a malfunction, and verifying the effectiveness of restoration work (such as revegetation) as well as the communication methods put in place by the proponent to inform authorities and local populations.

The sections below provide a summary (although not an exhaustive one) of the work proposed by the proponent for each follow-up. It is essential to note that, in addition to the FRP-S recommendations, the CNSC may also include follow-up measures as part of its authorization conditions if the Matoush advanced exploration project is approved.

### **11.2.1 Air quality**

#### Objectives

- Ensure that emissions released by the Matoush exploration activities conform to the projected emissions stipulated in the environmental assessment as well as in relevant standards and regulations.
- Gain a better understanding of the effects of the project on air quality and collect data that could be used, if applicable, to account for any unanticipated effect on vegetation, wildlife or the human environment.

#### Measures proposed by the proponent

Table 11.1 presents the proposed follow-up for the three project phases. Only sampling points AIR-1, AIR-2 and AIR-3 will be maintained during the site rehabilitation phase.

In response to the project review, Strateco increased air sampling frequency from biannual to quarterly, and proposed to install and use two high-volume air samplers in a location with an

available power supply: one total suspended solids sampler and another sampler for particulate matter less than 2.5 µm (PM<sub>2.5</sub>), each measuring concentrations for 24 hours every six days.

**Table 11.1 Adjusted air quality follow-up**

Sample ID	Location	Sample Type	Parameters	Frequency
AIR-1	Against wind upstream from reference site	Stationary sampler Alpha track radon gas detector Dosimeter	NO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub>  Radon in air Gamma radiation	Quarterly
AIR-2	With the wind downstream of site near waste rock pad	Stationary sampler Alpha track radon gas detector Dosimeter	NO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub>  Radon in air Gamma radiation	Quarterly
AIR-3 portal	Portal entry	Stationary sampler Alpha track radon gas detector Dosimeter	NO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub>  Radon in air Gamma radiation	Quarterly
AIR-4	Camp	Stationary sampler Alpha track radon gas detector Dosimeter	NO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub>  Radon in air Gamma radiation	Quarterly
Note <sup>1</sup>	Ventilation raise	Stationary sampler Alpha track radon gas detector Dosimeter	NO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub>  Radon in air Gamma radiation	Quarterly
AIR-5	According to available power source	HiVol	Total suspended particulates, PM <sub>2.5</sub> , metals and radionuclides (As, Cu, Fe, Mo, Ni, Pb, Se, U, Zn, Ra-226, Po-210, Pb-210, Th-230)	24 hours/6 days for one year (TSP and PM <sub>2.5</sub> ); Quarterly (metals and radionuclide)

Notes:

1. The AIR-3 (AIR-3 portal) ID will be applied to the ventilation raise when follow-up at the portal entry is replaced with follow-up of the operating raise (AIR-3 raise).
2. When in operation.

Additional measures recommended by FRP-S

- The proponent should confirm that it considered all sources and contaminants and that it produced conservative estimates. Some sources, for example, generate (total particulate (TP), PM<sub>10</sub> and PM<sub>2.5</sub>, whereas others generate CO, SO<sub>2</sub>, NO<sub>x</sub> and volatile organic

compounds (VOCs); these should be listed separately. This information could be included in the follow-up program to ensure better quality forecasts.

- The follow-up program should continue measuring TP concentrations to confirm that the highest TP concentration obtained in the reference concentration assessments was, in fact, an anomaly (as maintained by the proponent in the impact statement), and to verify the appropriateness of the measures to be put in place to mitigate dust on the 12 km of road. Dusty conditions are anticipated in summer, but such conditions are not expected to last. It is anticipated that there will be times when PM concentrations exceed or come close to predicted levels.
- Monitoring should include the mine exhaust, with detailed information on the source of air quality data and environmental monitoring. Any failure to transmit the measurements obtained from any of the sampling stations should be explained and justified. Regarding the passive air monitors used to measure NO<sub>x</sub>, NO<sub>2</sub> and SO<sub>2</sub>, the proponent must provide data pertaining to the accuracy and precision of this equipment. Measurement reports should include measured values, measurement location, measurement frequency, and conditions for ensuring quality control/assurance for the measured parameters.

### **11.2.2 Hydrology, geotechnical investigations, and water and sediment quality**

#### Objectives

- Monitor the capacity of water treatment facilities to produce effluents that meet federal and provincial requirements.
- Verify the effects of the effluent and runoff released into Lake Matoush, specifically the effects on aquatic life and water and sediment quality.
- Verify and update the hydrological model for surface water and produce a hydrogeological model for groundwater.

#### Measures proposed by the proponent

##### *Surface water quality*

Effluent from the treatment plant as well as surface water collected in catch basins will be released into Lake Matoush about 160 m upstream from the lake outfall. The measurements taken in the baseline studies will be used as reference data for future sampling (see Table 11.2).

The frequency of surface water quality follow-up shown in Table 11.3 will be applicable during the construction phase from the time the water treatment plant starts releasing effluent into the lake until the end of the underground exploration phase. This follow-up will be modified during the rehabilitation phase.

Strateco proposes to sample runoff in catch basin B in keeping with the weekly follow-up requirements set out in the MDDEP’s Directive 019 for the mining industry. The company also plans to gradually implement MMER during the exploration project so as to acquire more environmental data in preparation for the potential operation phase.

In response to the project review, the proponent modified water sampling frequency for Lake 5 from biannual to quarterly (i.e., seasonally) as prescribed in MMER. Strateco also intends to add lakes 4, 6 and 7, as well as one of the reference lakes (namely Lake 15). Yearly sampling will be carried out for these additional lakes in the fall as of the start of the work.

**Table 11.2 Environmental follow-up for surface waters: Analytical parameters**

<b>Parameters</b>		
<i>Regulated harmful substances</i>	<i>Parameters required for characterization</i>	<i>Parameters specific to project*</i>
Arsenic	Aluminium	Calcium
Copper	Cadmium	Sodium
Lead	Iron	Manganese
Nickel	Mercury	Selenium
Zinc	Molybdenum	Uranium
Radium 226	Ammonia	Magnesium
TSS	Nitrate	Potassium
pH	Alkalinity	Chromium
	Total hardness	Conductivity
	<i>Additional parameters required for follow-up</i>	BOD <sub>5</sub>
	Dissolved oxygen	
	Temperature	

Note:

\* These analyses are optional.

Source: EEM section 6 Effluent Characterization and Water Quality Survey

**Table 11.3 Sampling frequency**

Identification of Lake to be Sampled	Location	Frequency
Lake 5	Lake receiving effluent	Quarterly
Lake 4	Lake immediately upstream of Lake 5	Annually*
Lake 6	Lake immediately downstream of Lake 5	Annually*
Lake 7	Lake downstream of lakes 4, 5 and 6 near the boundary of the watershed of the local study area	Annually*
Lake 15	Lake located outside the watershed of the local study area; this lake will serve as the “reference lake”	Annually*

Note:

\*Sampling will take place in the fall.

*Sediment quality*

Sediment quality in Lake Matoush will be monitored as part of the follow-up program (see Table 11.4). The measurements taken as part of the baseline studies will be used as reference data for future sampling.

**Table 11.4 Follow-up of sediment quality**

Sample ID	Location	Sample Type	Parameters	Frequency
SED-1	Lake Matoush upstream of reference point	Composite	TOC, particle size, Ra-226, As, Cd, Co, Cu, Fe, Mo, Ni, Pb, Se, U, Zn, % moisture	Note 1
SED-2	Lake Matoush in area exposed to discharge point	Composite	TOC, particle size, Ra-226, As, Cd, Co, Cu, Fe, Mo, Ni, Pb, Se, U, Zn, % moisture	Note 1
SED-3	Lake Matoush downstream of exposed area	Composite	TOC, particle size, Ra-226, As, Cd, Co, Cu, Fe, Mo, Ni, Pb, Se, U, Zn, % moisture	Note 1

Note:

1. The first follow-up sediment sampling will take place within six months of the start of effluent being discharged into the lake. The second follow-up will be done upon completion of the project.

According to the data collected as part of the baseline studies, the sampling season for sediments will be in the fall. As activities on site will extend over a 24- to 32-month period, the second follow-up sampling of sediments should occur within three years of the first sampling in the rehabilitation phase.

*Quality of effluent and catch basin water*

The quality of the final effluent (Table 11.5) and the catch basin water (Table 11.6) will be verified before the effluent and water are released into the environment.

**Table 11.5 Quality of final effluent**

Sample ID	Location	Sample Type	Parameters	Frequency
EFF-1	Before transfer of mine water to first settling pond	Composite	pH, TSS, cond., temp., dissolved oxygen, U, Ra-226	Monthly
		Composite	Al, Cd, Hg, Mo, NO <sub>3</sub> , NH <sub>3</sub> , Se	Quarterly
EFF-1	At outlet to settling pond no. 2 before discharge into final conduit	Composite	pH, TSS, flow	Three times per week
		Composite	pH, cond., temp., dissolved oxygen, As, Cu, Fe, Ni, Pb, U, Zn, Ra-226, flow	Weekly <sup>1</sup>
		Composite	Toxicity (trout and daphnia)	Biannually
		Composite	Al, Cd, Hg, Mo, NO <sub>3</sub> , NH <sub>3</sub> , Se	Quarterly
		Composite	Alkalinity, chloride, cond., BOD <sub>5</sub> , DOC, flow, hardness, fluoride, C <sub>10</sub> -C <sub>50</sub> , TSS, pH, TDS, total solids, phenol, sulphate, turbidity, NO <sub>3</sub> -N, TKN, P <sub>tot</sub> , Al, As, Cd, Ca, Cr, Co, Cu, Fe, Mg, Mn, Hg, Mo, Ni, Pb, K, Ra-226, Se, Si, Na, Zn, toxicity (trout and daphnia)	Annually (July or August)

Note:

1. Considering the anticipated quantity of effluent and the lack of ore processing facilities on site, the sampling frequency for these parameters will be changed from once per week to once per month after four months of operation.

The frequency of final effluent quality follow-up can be adjusted in terms of outcomes. If modifications are made, they will be communicated in advance to the CNSC for approval.



This follow-up monitoring will be applicable during the construction phase from the time the water treatment plant starts releasing effluent into the lake until the end of the underground exploration phase. It will be modified during the rehabilitation phase.

Unless the results of the field and laboratory tests indicate a potential problem in connection with the concentration of one or more parameters, the final effluent will be released into the lake on an ongoing basis. The discharge of effluent from the contaminated water treatment plant represents the component of the project with the greatest risk if the concentrations of certain parameters were to exceed specified levels. In this regard, the proponent has established action levels at which point corrective measures will be triggered to resolve a problem situation. These levels provide a safety margin to ensure prescribed levels are not exceeded.

Administrative threshold levels also help determine whether final effluent concentrations are slightly higher than normal and if an investigation is required to identify the causes of abnormal measurements. The CNSC will be informed of any values that exceed administrative thresholds. Action levels for their part indicate a potential loss of control of the contaminated water treatment process. In the event administrative threshold levels are exceeded, sampling frequency will be increased; should the results continue to indicate concentrations beyond those levels, the action level will be triggered. Strateco will then conduct an investigation to determine the causes of the problem and corrective measures will be immediately put in place to remedy the situation. In this scenario, the CNSC will be informed of the situation and action undertaken.

Sampling frequency for catch basins (see Table 11.6) will depend essentially on precipitation levels. Should the results indicate a potential contamination problem, the catch basin water will be directed toward the treatment plant.

**Table 11.6 Quality of catch basin water**

Sample ID	Location	Sample Type	Parameters	Frequency
CB-A-1	Catch basin A (runoff on north part of portal)	Grab	pH, TSS, cond., temp.	Note 1
CB-B-1	Catch basin B (runoff on south part of portal)	Grab	pH, TSS, cond., temp., U, Ra-226, As, Cu, Fe, Pb, Ni, Zn	Note 1

Note

1. Sampling frequency will depend on precipitation. Water in the catch basins will be kept at the lowest possible level. No sampling will be done in the winter season.

### *Hydrogeological and geotechnical conditions*

Strateco noted that one of the objectives of the underground exploration program is to enhance understanding of the hydrogeological conditions that influence groundwater flow in and outside underground excavations. More specifically, because fault zones represent a rapid migration route for contaminants, local fault zones need to be characterized more thoroughly so as to identify potential water infiltration and prevent contamination of the immediate environment.

### *Additional measures recommended by FRP-S*

- FRP-S recommends that sampling frequency be increased from an annual basis to a quarterly basis for Lakes 6 and 7 because these lakes are directly downstream from Lake 5.
- FRP-S supports the recommendation made by CPAWS that Strateco install a sampling station well downstream from the Matoush site so as to detect any changes in hydrological, chemical and biological conditions within the ATO national park project area.
- FRP-S would like to remind regulatory bodies as well as the proponent of the importance of consistently defining follow-up parameters (location, frequency, periods, etc.) for the aquatic environment.
- FRP-S supports the CNSC's expectation and the measures taken by the proponent to gather more data during the underground exploration phase so as to gain a better understanding of the hydrogeological and geotechnical conditions of the site, specifically the characteristics of the fault zones.
- FRP-S supports the CNSC's recommendation that the measures taken by the proponent be reviewed and adapted to ground conditions as the excavation progresses. The information below concerning the geology of the site, site evaluation and the excavation design and methods must be incorporated into the follow-up program specified in the CEEA:
  - Characterize the Argillaceous fault before excavating into the fault. Once the characterization is complete, the stability of the fault and the required retaining structures should be reviewed. The possibility of a preferential drainage channel should also be considered before the ramp is built into the fault.
  - Drill boreholes as the ramp is built so as to detect in advance any unfavourable geological, geotechnical or hydrogeological conditions in the advance working.

Special attention should be paid to the Argillaceous fault zone, the area in the vicinity of the Matoush fault, and the Saccharoid CBF2 unit.

- Prepare geological maps as the excavation of the ramp progresses so as to confirm/verify the geological, geotechnical and hydrogeological conditions of the site and to incorporate new data for the geology and structural analysis of the site. The stability of the ramp (i.e., stability of the back and walls by way of kinematic/structural analysis) must be confirmed using confirmed/verified geological, hydrogeological, structural and geotechnical conditions or newly acquired data, and retaining structures must be reviewed accordingly.

### **11.2.3 Wildlife, plants and at-risk or threatened species**

#### Objectives

- Ensure the Matoush exploration project does not produce any undesirable direct impacts on wildlife (in particular, on species that are valued locally and on woodland caribou, which is a threatened species).
- Enhance quality of baseline data on wildlife, plants, and at-risk and threatened species, as well as ecotoxicological risk.
- Verify anticipated effects of the project on wildlife and determine the need to apply corrective measures (e.g., adaptive management).
- Evaluate success of revegetation and reforestation and make any necessary adjustments.

#### Measures proposed by the proponent

##### Benthos

Follow-up monitoring of benthic invertebrate communities (see Table 11.7) will be carried out in conjunction with sediment follow-up. Measurements taken in baseline studies will serve as reference data for future sampling.

**Table 11.7 Follow-up of benthic invertebrate communities**

Sample ID	Location	Sample Type	Parameters	Frequency
BEN-1	Lake Matoush upstream from reference point	Composite	TOC, particle size, % moisture, density, family level richness, Simpson's diversity index, Bray-Curtis coefficient	Note 1
BEN-2	Lake Matoush in area exposed to discharge point	Composite	TOC, particle size, % moisture, density, family level richness, Simpson's diversity index, Bray-Curtis coefficient	Note 1
BEN-3	Lake Matoush downstream of exposed area	Composite	TOC, particle size, % moisture, density, family level richness, Simpson's diversity index, Bray-Curtis coefficient	Note 1

Note:

1. The first follow-up sediment sampling will take place within six months of the start of effluent being discharged into the lake. The second follow-up will be done upon completion of the project.

Benthos sampling will take place in the fall. In view of the duration of the exploration work, the second follow-up of benthic invertebrate communities—scheduled to take place less than three years after the first—will occur during the rehabilitation phase.

*Revegetation of restored sites*

Where feasible, Strateco plans to restore and rehabilitate certain sites affected by the work as soon as conditions permit. Levelling, seeding and planting will be done to cover borrow pits and borrow pit access roads once operations at the sites have wound down. In addition, the top of the portal will be revegetated to minimize the visual impact of the project.

Revegetation of the waste rock pad during the exploration phase is not planned because these materials will be used in the construction of access roads and other infrastructure. Given the volume of materials required for construction in relation to the excavated volume, it is very unlikely that waste rock will remain on the pad provided for this purpose for any length of time. If there is any waste rock on the pad upon completion of the underground exploration work and the exploration results do not justify mining operations, the remaining waste rock will be contoured, covered and seeded. Any special waste rock that remains in the storage area provided for that purpose will be put back underground and will therefore not require revegetation.

Plant species and seed mixes will be selected according to regional climatic conditions and their capacity to adapt to local soil conditions and the water balance for the area.

Follow-up monitoring will help confirm the regrowth of vegetation throughout the exploration project. Measures will be carried out on site about two years after the revegetation activities to assess the survival rate of the plantations and/or seeded areas.

The results of the follow-up of the revegetation and restoration work, supported by photographs, will be incorporated into the proponent's annual report.

Additional measures recommended by FRP-S

- Follow-up measures aimed at specifying and completing the regional characterization of terrestrial wildlife and bird life will be necessary, especially for caribou and species consumed by local populations. FRP-S therefore recommends that the Federal Administrator and the CNSC include a detailed characterization of initial environmental conditions (water, sediments, and terrestrial and aquatic wildlife and plants) in the follow-up measures the proponent is required to apply.
- FRP-S strongly encourages the proponent to be diligent with regard to the woodland caribou and to discuss the types of follow-up measures it could apply with the MRNF.
- With regard to benthos, FRP-S is of the opinion that additional sampling should be carried out three and five years after project start-up, rather than only upon completion of the project as planned by the proponent.

#### 11.2.4 Human health

##### Objective

- Ensure that any project activities that could have an impact on ionizing radiation, road accidents or traditional food contamination do not increase health risks for workers or members of nearby communities.

##### Measures proposed by the proponent

An occupational health services department will be established at the Matoush camp for the duration of the work. This department will carry out a medical examination for each of the permanent workers at the site.

All workers who may be exposed to ionizing radiation will be equipped with dosimeters that are supplied and analyzed quarterly by Health Canada in Ottawa. These same workers will also be subject to quarterly urine tests that will be analyzed by an accredited laboratory recognized by the CNSC. Each worker will be personally informed of the test results.

The proponent explained that, prior to embarking on the project and within the context of the CNSC licence application process, it would submit a radiation protection and dosimeter program describing action levels and procedures if uranium concentrations are detected in urine or if gamma radiation is recorded on dosimeters.

##### Additional measures recommended by FRP-S

- The proponent has not proposed any follow-up measures for fish species that have existing contaminant levels in excess of the standards. As mercury levels observed in fish are relatively high, one could assume that soil contamination levels are just as high and that project activities could lead to the release of mercury into water bodies. To confirm the predictions generated by the theoretical model (according to which project activities would not increase mercury levels in fish), FRP-S recommends that the proponent monitor mercury levels in the flesh of predator species that are consumed regionally and are likely to be found in Lake Matoush and downstream.
- FRP-S recommends that the proponent retain for future reference detailed files on accidents involving its vehicles, contractors or employees on access roads.

### 11.2.5 Economic and quality of life benefits

#### Objectives

- Determine precisely what the economic benefits will be for local communities.
- Identify the indicator(s)—other than economic—that could be used to assess the impacts of the project on the quality of life of residents in local communities.

#### Measures proposed by the proponent

In its follow-up of the economic benefits of the Matoush project, Strateco Resources plans to verify the economic impacts for the communities of Mistissini, Chibougamau and Chapais. The economic benefits of the project to be monitored during the exploration phase of the Matoush project are direct jobs created, contracts awarded, and the goods and services purchased.

#### Additional measures recommended by FRP-S

- FRP-S is in agreement with the economic follow-up measures proposed by the proponent, and believes that the results of the proponent's consultations and collaborative efforts with local and regional bodies to ensure the proposed hiring, supply and training objectives are implemented and achievable should be presented to the Federal Administrator and the CNSC.
- Owing to the fears associated with this project and with a view to facilitating public discussions, FRP-S recommends that the proponent conduct a follow-up of risk perceptions in local communities in response to these issues.
- As the airstrip built by the proponent could serve purposes other than just the Matoush project—which could limit the number of airstrips built in the region and allow other users to benefit from existing facilities—FRP-S suggests that the proponent maintain a log of airstrip users during the exploration project (e.g., mining companies, emergencies, hunters) along with the management services provided.

### 11.2.6 Physical integrity of the infrastructure

#### Objectives

- Verify the physical integrity of the facilities to prevent any environmental impact in the event of breakdowns.

#### Measures proposed by the proponent

The proponent proposes to carry out various periodic inspections (e.g., routine, detailed, annual) throughout the site. These inspections will be performed by Strateco Resources personnel—primarily environmental technicians or external technicians—as required. Detailed procedures will be established for each type of inspection. Given that site security officers will be touring the site, the proponent suggests that they, too, could be involved in environmental monitoring efforts.

Inspection forms will be completed for each round and a copy sent to Strateco Resources' Environmental Director. No official inspection report (i.e., one that would be sent to government authorities) will be prepared for routine or detailed inspections. Some of the data acquired will, however, be included in the annual report, including the volume of waste rock and special waste rock, the area used on the pads for storing waste, and any major event that occurred and is likely to have environmental repercussions as well as any corrective actions taken to rectify the situation. The external specialist technicians in charge of the specific annual inspections will present a detailed report including photographs describing the state of the components they have been assigned to inspect. The results of these inspections will be included in Strateco's annual report.

#### Additional measures recommended by FRP-S

- FRP-S agrees with the measures proposed by the proponent to verify the integrity of the infrastructure.



### **11.2.7 Site restoration**

#### Objectives

- Determine whether unexpected impacts will occur during or after the restoration of the site and put applicable corrective measures in place.

#### Measures proposed by the proponent

The environmental follow-up to be carried out during the site restoration phase will be modified slightly from that performed during exploration and construction activities. These changes are primarily because some conditions, such as the release of effluent into the lake or the release of various types of contaminants, will not exist during the restoration phase or, at least, from a certain point in that phase. The program will nevertheless be submitted to the relevant government agencies for approval prior to implementation.

Post-restoration follow-up will focus on surface water, air quality and the success of revegetation efforts. The frequency of this follow-up will be reduced compared to that in the construction, exploration and rehabilitation phases. The post-restoration follow-up program will be submitted to the relevant government agencies for approval prior to implementation.

#### Additional measures recommended by FRP-S

- FRP-S supports the follow-up measures proposed by the proponent with regard to site restoration.

### **11.3 COMMUNICATION MECHANISMS**

#### Measures proposed by the proponent

The results of the monitoring and follow-up program will be forwarded to the CNSC in an annual report.

The proponent plans to maintain communications with the local population through an independent advisory board made up of representatives from the various authorities and groups: tallymen, members of the Mistissini community, the CBHSSJB, Cree Trapper's Association, and so forth. The board's primary role will be to inform the local population about activities at the Matoush site and

forward questions and requests from the local population regarding the project (including the environmental component) to Strateco management.

Additional measures recommended by FRP-S

- The results of the monitoring and follow-up programs shall be forwarded annually not only to the CNSC but also to the Federal Administrator during project construction, sample extraction and, if applicable, the site closure and rehabilitation phases.
- As is recommended in the CRÉBJ submission, FRP-S recommends that the advisory board reports and meetings be made public and available either on a website or in the annual monitoring reports.
- FRP-S supports the CBHSSJB recommendation that all environmental monitoring reports be forwarded on a regular basis to the local environmental health authority, the Cree Regional Authority and the Mistissini Local Environment Administrator. FRP-S also encourages the proponent to increase discussions with tallymen and the Mistissini community with regard to its monitoring and follow-up activities, and to disclose all accidents and spills and reassure territory users that measures will be put in place to correct any problems that may arise.
- In view of paragraph 55.1(1) t) of CEEA as well as the opinions expressed during public hearings with regard to the importance of monitoring, FRP-S believes that monitoring reports should be made public, either on the CNSC website or the CEEA website.

## **11.4 PRINCIPLES UNDERLYING THE APPLICATION OF THE FOLLOW-UP PROGRAM**

### **11.4.1 Adaptive management approach recommended by FRP-S**

Subsection 38(5) of the CEEA stipulates that the results of follow-up programs may be used for implementing adaptive management measures—in particular, if mitigation is not appropriate for preventing, reducing or controlling environmental effects. Moreover, other sources of effects could be identified during the project and new mitigation measures may well need to be implemented. FRP-S consequently recommends that the proponent adopt the following adaptive management measures:

- If adaptive management measures are required, the proponent's planned mitigation measures will be developed in cooperation with the CNSC and, where applicable, with representatives from the Cree Regional Authority or the Mistissini Cree community.
- The proponent will be responsible for determining appropriate methods to ensure environmental effects are consistent with the effects predicted in the environmental assessment.
- As a contingency—that is, to deal with circumstances that require immediate action (for example, where there are indications of adverse effects on water quality, wildlife or resource use)—the proponent shall immediately report the incident directly to the CNSC, the Cree Regional Authority and the Federal Administrator.
- If, during the implementation of the follow-up program, it becomes apparent that modifications are required, the proponent shall retain the initial sampling stations and parameters for potential comparative analyses in future. The proponent may, however, add other stations or parameters as necessary.
- If the Matoush project does not proceed to the operations phase, the proponent shall continue environmental follow-up until the appropriate authorities deem that the observed trends have stabilized and/or the environmental contaminant concentrations have returned to baseline levels.

#### **11.4.2 Administrative and organizational measures**

FRP-S is aware that the follow-up efforts Strateco is being asked to make are substantial, but believes that these recommendations will overcome certain shortcomings in the impact statement and will represent an environmental investment for a future mining development phase. To ensure the appropriate resources are provided for the environmental and social management plan, FRP-S recommends the following measures:

- The proponent shall submit a clear commitment to the Federal Administrator and the CNSC detailing the human, financial and technical resources that will be committed to ensure follow-up measures are fully implemented.

- As part of this commitment, the persons in charge of follow-up and monitoring will have the means and authority to stop the work in the event an unexpected incident, malfunction or accident that could have an environmental effect.

## 12 CONCLUSION AND RECOMMENDATION

This report on the Matoush underground exploration project was prepared by FRP-S for the Federal Administrator in accordance with section 22 of the JBNQA, as well as for the CNSC (the federal authority for this project under the provisions of the *Canadian Environmental Assessment Act*). An analysis of the data submitted by the various stakeholders allowed FRP-S to draw conclusions with regard to the potential environmental effects of the project.

### 12.1 CONCLUSION UNDER THE CEEA

FRP-S concludes that, provided the proposed mitigation measures are implemented, the Matoush underground exploration project is not likely to cause significant adverse environmental effects on the human, biophysical and biological environment.

### 12.2 RECOMMENDATION UNDER SECTION 22 OF THE JBNQA

In light of the resolution by the Cree Nation of Mistissini to reject the project, the resolution by the Grand Council of the Crees to support a moratorium on all uranium exploration and mining activities on Mistissini Cree traditional lands, and the CRÉBJ's view that regional consensus on the project is essential, FRP-S believes that the utmost attention must be given to and a precautionary approach taken to authorizing the proponent to proceed with the project.

In view of the nature of the project—which differs from other types of mining projects underway on JBNQA territory—FRP-S is of the opinion that an endorsement of the project by local communities is a key factor and therefore recommends that the additional information as indicated in paragraph 22.6.13 of section 22 of the JBNQA be gathered and submitted by the proponent to the Federal Administrator before a decision is made to authorize the advanced exploration project at the Matoush camp. This information required in advance concerns three major conditions addressed in this report:

- a revised additional baseline data collection program
- a new version of the ecological risk assessment that takes into consideration realistic scenarios and parameters

- an evaluation by the proponent, in collaboration with the Cree Nation of Mistissini, of the implementation of information sharing and communication mechanisms that result in:
  - a change in risk perception within Mistissini community
  - consultations and collaboration with local and regional organizations, specifically with regard to ensuring the proposed hiring, supply and training objectives are implemented and achievable
  - measures undertaken by the proponent to re-establish dialogue and evaluate the Council's receptiveness to negotiating an agreement on the repercussions and benefits of the advanced exploration phase

Subject to compliance with these conditions by the proponent and in the case where social acceptability conditions for the project have improved, FRP-S is satisfied that the project, following the implementation of the measures and conditions summarized below, is not likely to cause significant adverse environmental and social effects that would infringe on the principle of protecting the way of life of the Cree. FRP-S therefore recommends that the project, as presented in the environmental impact statement and the documents complementing the impact statement, be authorized on the condition that the proponent complies with the advice and conditions outlined in this document. The advice and conditions relate to:

- mine effluent and location of effluent outfall (section 6.3.4)
- location of the drinking water intake (section 6.3.4)
- presence of a Cree coordinator to provide employment and worker support (section 6.9)
- emergency measures in the event of an accident, malfunction or spill at the site, and the coordination of these measures with the appropriate local and regional organizations (sections 7 and 8)
- review of the follow-up measures (section 11) regarding:
  - air quality
  - surface water, groundwater quality and sediment quality, including inflow and effluent
  - wildlife and species at risk
  - human health
  - economic benefits

In the event that an authorization request for a uranium mine project should be submitted following the performance of the advanced exploration activities, FRP-S recommends that this project be immediately subject to a JBNQA-CEAA federal review panel, given that strong concerns were expressed at the FRP-S public hearings regarding the development of a mine and a uranium processing plant on JBNQA territory.

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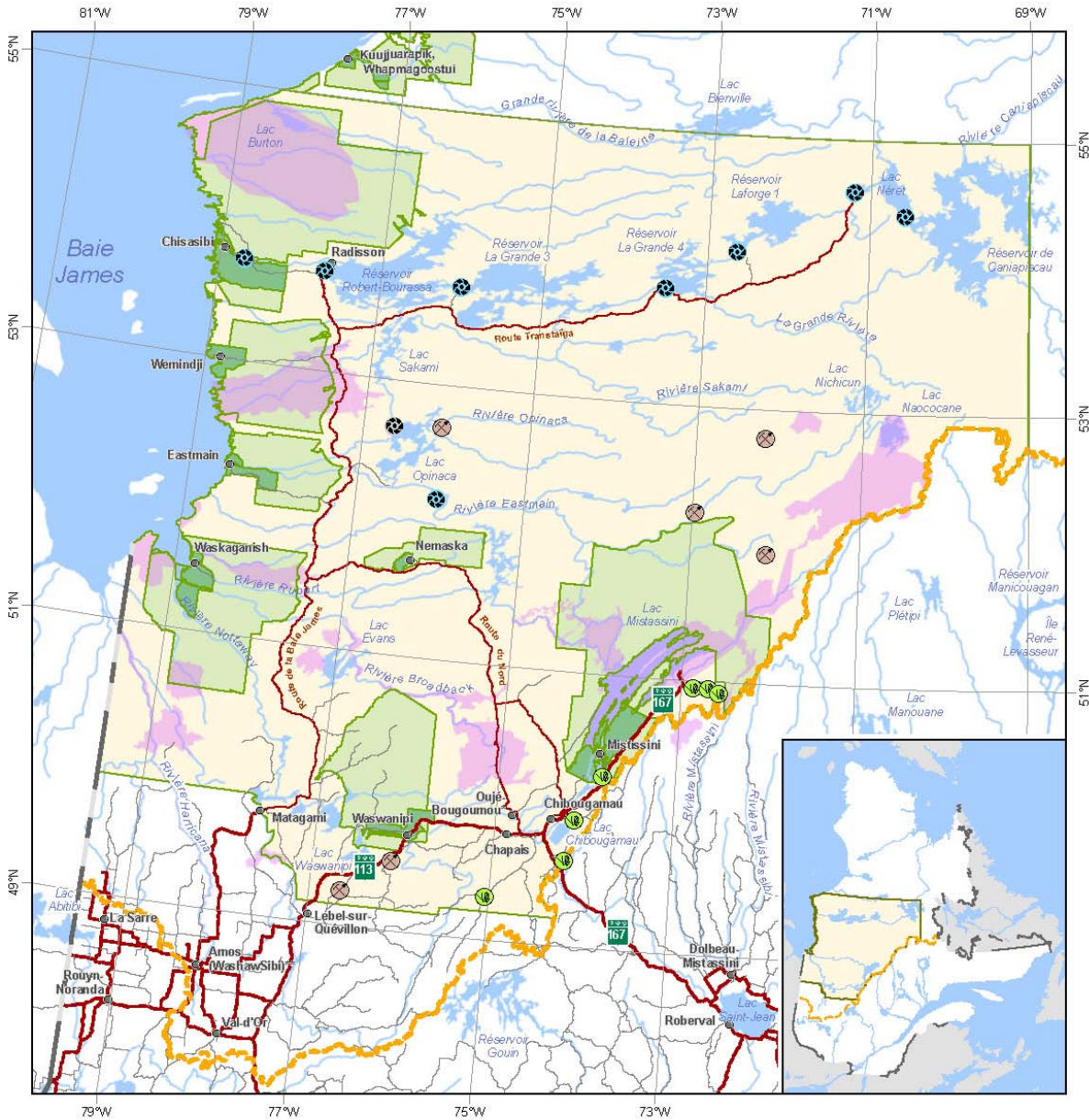
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# **Appendix 1**

## **Map of the Territory Covered by Section 22 of the JBNQA**

### Territory covered by the environmental and social protection regime



- Limits**
- Territory covered by the regime <sup>1</sup>
  - Cree Category I lands
  - Cree Category II lands
  - Southern limit of JBNQA Territory
  - Border
- Infrastructures**
- Mining project
  - Hydroelectric power station
  - Hydroelectric power station in construction

- Conservation areas**
- Exceptional forest ecosystem
  - Protected area
- <sup>1</sup> The Crees do not recognize the southern limit of the regime as defined on this map
- + Oujé-Bougouinou Category I and II lands are under negotiation
- \*\* The WashawSibi Eeyou Association is temporarily based in Amos

**Sources**

Land division, mine site, MRNF-Québec, 2011  
 Exceptional forest ecosystem, MRNF-Québec, 2011  
 Protected area, MDDEP, 2011  
 Hydroelectric infrastructures, CEHQ, 2011

0 45 90 km

Scale : 1 : 4 500 000  
 Map projection : Conique de Lambert, NAD83  
 Produced by : Groupe Nippour, June 2011



## **Appendix 2**

### **Federal Administrator’s Review Process Decision and Directives**



Canadian Environmental Assessment Agency    Agence canadienne  
d'évaluation environnementale

President

Président

160 Elgin St., 22nd floor  
Ottawa ON K1A 0H3

160, rue Elgin, 22e étage  
Ottawa ON K1A 0H3

Guy Hébert  
President  
Strateco Resources Inc.  
1225 Gay Lussac  
Boucherville QC J4B 7K1

Subject: Matoush mining exploration project subject to the federal review process  
(Section 22 of the *James Bay and Northern Quebec Agreement*)

Dear Mr. Hébert:

I hereby inform you of my decision, under section 22.5.15 of the *James Bay and Northern Quebec Agreement* (JBNQA), to subject the Matoush uranium underground exploration project to the environmental and social assessment and review process as specified in section 22 of the JBNQA. This decision, based on the recommendation of the Evaluating Committee (COMEV), was made subsequent to the receipt of information from Strateco Resources Inc. I would also like to inform you that I have commissioned the Federal Review Panel – South (FRP-South) to conduct the review process.

Since uranium exploration activities fall under federal jurisdiction, the mandate assigned to FRP-S extends to the entire project. Given the elements associated with uranium exploration and mine operations that may raise concerns, and pursuant to section 22.5.15 of the JBNQA, I would ask that the communities affected by the project be appropriately consulted. Such consultations should take into consideration the operations phase so as to better anticipate the elements that could affect the social acceptability of the project overall.

.. /2

Canada

- 2 -

You will find attached the directives pertaining to the environmental and social assessment to be produced. These directives were developed with a view to complying with both federal and provincial assessment procedures. I would also suggest that you produce a single impact statement that meets the requirements of both procedures. You will also find attached an appendix to the directives produced by the federal members of COMEV with input from the Canadian Nuclear Safety Commission to assist with the preparation of the impact statement.

We ask that you send three electronic files and ten printed copies of the environmental and social impact assessment report you produce to the attention of Benoît Théberge, executive secretary of FRP-South, at the address below:

*Canadian Environmental Assessment Agency  
1141 Route de l'Église, 2<sup>nd</sup> Floor  
P.O. Box 9514, . Sainte-Foy Station  
Quebec City, QC G1V 4B8*

Mr. Théberge will take charge of forwarding the documents to the members of FRP-South as well as the relevant federal authorities.

Yours sincerely,

*Original signed*

Peter Sylvester  
Federal Administrator  
James Bay and Northern Quebec Agreement

Enc.

c.c. Barclay Howden, Canadian Nuclear Safety Commission



# **Directives**

Matoush Uranium Exploration Project Strateco Resources Inc.

February 2009

**Evaluating Committee (COMEV)**

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## 1. INTRODUCTION

These directives are intended to help Strateco Resources Inc. (the proponent) prepare the environmental and social impact statement required for its uranium exploration project on the Matoush property. Given the nature of the project, the impact statement must discuss, in a satisfactory manner, the environmental issues associated with uranium exploration and outline the impacts related to future phases of the project to bring a uranium mine into production. The preliminary information regarding the Matoush exploration project was transmitted to the Evaluating Committee (COMEV) on August 11, 2008, so that it could make recommendations to the provincial and federal administrators of section 22 of the James Bay and Northern Québec Agreement (JBNQA) on the advisability of submitting the project to the environmental and social impact assessment and review procedure provided for in section 22 of the JBNQA and Chapter II of the *Environment Quality Act* (EQA). On September 19, 2008, COMEV recommended that the project be subject to impact assessment. Consequently, in accordance with section 158 of the EQA and paragraph 22.5.14 of the JBNQA, these directives set out the recommendations regarding the extent of impact assessment to be carried out by the proponent.

### 1.1 Matoush Uranium Exploration Project

The aim of the Matoush exploration project is to confirm mineral reserves and evaluate the economic viability of bringing a mine into production. The underground exploration program consists of site preparation, excavation of an access ramp and exploration drifts for definition drilling. Excavation will take place in waste rock and ore. The exploration work will also allow assessment of the quantity and processing of mine water, ventilation, mining methods and ore stockpiling. Excavation of the ramp is slated to begin in early June 2009 and the other work will continue until July 2012.

### 1.2 Legal and Regulatory Framework for the Project

Strateco Resources must obtain the authorizations required under section 22 of the JBNQA and the applicable federal and Québec statutes and regulations. The impact statement must discuss the legal framework within which the project is being carried out, including all agreements, treaties, statutes and regulations applicable to the project. The proponent must specify all government policies, guidelines and directives relating to the sector of activity concerned (e.g. Directive 019) as well as comply with all applicable regulations. It must also explain how the various authorization processes relate to each other and where the proponent is at in them.

### 1.3 Communication and Consultation

The proponent must inform and consult the communities concerned by the project (elected officials, groups, organizations, land users and the general population) under a program adapted to the cultural and social context of the project. Special attention must

be given to aspects of the project that are associated with radioactivity, such as the local population's perception of potential radiation problems. The planned mining phase following exploration should be taken into consideration here so that significant elements liable to affect the project's overall acceptability can be more accurately foreseen and the concerns expressed by the population, addressed. Risks must be discussed separately for each phase.

Information and consultation activities must deal with, among other things, radioactivity and the environment, project description and impacts, mitigation measures, monitoring and follow-up programs, etc., and allow citizens to express their opinions, views and concerns regarding the project.

The impact statement must discuss, in a clear manner, the proponent's communication program and the outcome of information and consultation activities. The proponent must also explain any changes made to the project in light of the concerns expressed by those consulted.

## **2. GENERAL CONSIDERATIONS FOR THE IMPACT STATEMENT**

These directives are neither restrictive nor exhaustive. The proponent is required to include any other element in the impact statement that it deems pertinent to the project's environmental and social assessment. The impact statement must be designed and prepared following the generally accepted rules of good practice. Appropriate scientific methods must be used to collect, process and analyze data. The impact statement must satisfy the recognized requirements relating to project definition, impact assessment, public consultation and decision-making and explain the process of putting together a project that is socially and environmentally acceptable, in particular:

- the implementation context, rationale and characteristics of the project;
- the state of the biophysical and human environments in which the project will be carried out and the predicted alterations in those environments during and after the project;
- integration of the project into the environment, including a comparative analysis of the impacts of each of the alternative means of carrying out the project, where necessary, and the planned measures for minimizing or eliminating negative environmental and social impacts and maximizing positive impacts;
- the proposed monitoring and follow-up programs and procedures to satisfy government requirements and track changes in certain environmental components affected by the project.

Given the specific nature of the project, the impact statement must describe the radioactivity-related aspects that make this project different from other types of mining activities. Furthermore, given the anticipated extension of the Matoush exploration project, the environmental and social impact assessment and review must illustrate, insofar as possible, the specifics of the impacts associated with mining and mill operations. Indeed, the contentious elements of bringing a uranium mine and mill into production must be taken into consideration so as to determine the acceptability of

advanced uranium exploration. In particular, the proponent must document the potential impact of effluent containing radioactive substances on surface and groundwater quality, of disposal of radioactive waste in underground mine drifts on groundwater quality, and of the storage of radioactive tailings on air, groundwater and surface water quality. This section must provide a detailed description of the management of radioactive tailings sites, the impact of radioactive dust emission on air quality and the fate of project elements in the event that work is halted earlier than planned.

The information in the impact statement must be presented in a clear and concise manner and be limited to aspects enabling a thorough understanding of the project and its impacts. Whatever can be illustrated in diagrams or mapped must be done so by way of appropriate-scale thematic and synthesis maps and plans according to the type of data and presentation standards. Wherever possible, the proponent should use photographs to illustrate salient information so as to enable a thorough understanding of the project and its setting. The best-quality data must be used to prepare the impact statement based on possibilities. All information sources must be identified and supplied where required. In addition, the methods used to prepare the impact statement (survey, inventory, comparative analysis, criteria, etc.) must be presented and explained, giving the proper references.

### **3. CONTENT OF THE IMPACT STATEMENT**

The environmental and social impact statement covers seven main elements: project background, project description, description of the receiving environment, impact assessment and mitigation, risk management, monitoring program and follow-up procedures.

#### **3.1 Project Background**

The purpose of this section of the impact statement is to explain the reasons for the project. The project background must be explained in such a way as to enable readers to grasp the environmental, social, economic and technical issues relating to the project at the local, regional, provincial and international levels, as the case may be.

### **3.1.1 The proponent**

The impact statement must provide a succinct description of the proponent and, if applicable, its environmental consultant, including general information on their background relative to the project in question and the sector of activity concerned. This section will include an explanation of the company's administrative structure, its capacity to provide the required financial guarantees for environmental restoration measures, and the principles of its environmental and sustainable development policy. The information provided must show where the company stands (its size) within its sector of activity in Canada and internationally.

### **3.1.2 General project description**

The proponent must give the historical background to the main phases and stages of previous exploration campaigns that led to the current project, mentioning existing infrastructures, environmental and social issues encountered and any agreements entered into for the use of services or the carrying out of remedial work to mitigate the impacts of the current exploration program. This section of the impact statement must include a brief description of the project, including the location of infrastructures and the principal technical characteristics at the initial planning stage. It must also compare the Matoush project with uranium mining technologies used elsewhere in Canada.

These things must be described in enough detail to highlight the extent of planned work and the social context of the project. Emphasis will be placed on the general context and aims of the project, related components, and the project schedule and costs. Planned future expansions or developments associated with the project must also be explained.

### **3.1.3 Project rationale and justification**

This section of the impact statement must justify the project, i.e. objectives and activities, and identify the environmental, social, economic and technical issues at stake. The proponent must describe the environmental and socioeconomic context of general mining development in the region as well as the economic spinoffs of the uranium project at the local, regional and provincial levels, relating them to the life of the project.

This project is competing against numerous other projects in Canada and around the world. Several factors are key to its success. The proponent must describe those factors and explain why they would give its project an advantage over other uranium projects, considering that some have been refused in the Northwest Territories and Yukon. In this regard, the proponent must explain the criteria, aside from profitability, that will be used to decide whether the project will move to the mining phase.

## **3.2 Project Alternatives**

The proponent must determine the best alternatives to the project, placing emphasis on specific elements liable to influence the final choice. Using appropriate supporting documents, the proponent will describe the alternatives (location and technologies)

capable of achieving the project objectives. The rationale and criteria used to select the final technologies and locations must be explained, along with how environmental and social criteria were considered. The proponent will explain what set the optimal alternatives apart from the other alternatives considered and why they were selected for in-depth impact assessment for the purposes of the impact statement.

### **3.2.1 Alternative locations**

The proponent must describe the various locations considered for the infrastructures required for uranium exploration, including excavation of the access ramp, development of waste rock and ore stockpile areas and groundwater protection. The geological, geotechnical, hydrological and hydrogeological features of the area must be considered and supported by photographs of each of the possible sites and surrounding area. Consideration must also be given to potential technical and financial constraints and the extent of impacts arising from the selected locations.

The description must be detailed enough to enable a comparison of the locations considered and evaluate the environmental, social, technical and economic advantages of each.

### **3.2.2 Alternative technologies**

The promoter must briefly describe the advantages and disadvantages of the principal ore extraction and environmental protection technologies considered, explaining the role mineralogy played in making the final decision. The preferred technologies must then be described, including the technical, economic and environmental reasons and criteria for choosing them. If need be, the project can be compared with the mining technologies used for other uranium deposits in Canada and around the world.

This section of the impact statement must discuss the advantages and disadvantages of the principal technologies considered for environmental and social protection in terms of achieving liquid effluent discharge targets, air emission standards and waste management rules with a view to protecting aquatic, terrestrial and atmospheric environments.

## **3.3 Project Description**

The proponent must describe the planned work and the location thereof, supporting the information by means of the appropriate data (maps, plans, 3-D schematic diagrams, drawings of the mine site and its infrastructures currently and after the project, analyses, photographs, etc.). The following information must also be provided: the location, surface area, and property titles of deposits and land where planned infrastructures will be built; site preparation (clearing, blasting, watercourse diversion, earthwork, backfilling, buildings, etc.), providing details on the sites, quantities, boundaries and collection, haulage, storage and disposal methods; the projected duration of mineral exploration; the project schedule; the average rate of waste rock and ore extraction (considering that no ore will be processed during this phase); and justification for mining work and methods. Descriptions of ore, waste rock, acid generation potential, leach or radioactivity tests must be based on a sufficient number of representative samples and sufficiently accurate

estimates so as to reduce uncertainties in the modelling of contaminant discharges into the environment.

### **3.3.1 Preparatory activities**

The following must be included in the description of the construction phase:

- a plan view, at a suitable scale, of all project components and, as needed, elements such as the design plan for the access ramp and drifts;
- a perspective drawing showing all of the project components within the landscape and, if possible, aerial photos or other recent photographs of the project area;
- overburden (amount, nature, storage, reuse, etc.);
- solid waste (type, quantity, sites, disposal methods, etc.).

### **3.3.2 Exploration work**

The purpose of this section of the impact statement is to describe the proposed methods for underground extraction, storage, loading and hauling of ore, as the case may be. The proponent must describe:

- permanent facilities and infrastructures (access ramps, dikes, ore pads, water treatment units, parking areas or sheds for machinery and equipment, discharge points in receiving waters, etc.);
- excavation of the ramp (geomechanical stability, stabilization methods, groundwater inflow rates, amount of ore and waste rock), duration of work and possibility of carrying out other development phases;
- description of ore and waste rock (types, quantities, all mineralogical characteristics, radiological characteristics, storage time) based on representative samples and sufficiently accurate estimates;
- determination of acid-generating potential, leach and radioactivity tests based on representative samples and sufficiently accurate estimates to correctly simulate contaminant discharges into the environment;
- mining method(s) that ensure worker safety and generate less waste rock;
- types of explosives used, their in-situ fabrication and storage, the approximate amount required per amount of ore extracted, and the principal residual chemical products resulting from their use;
- amount of ore to undergo testing (processing), ore management and haulage and the type of truck needed to haul ore to the processing site;
- determination of ore storage sites, if any, and reasons for choosing those sites; storage capacity and maximum storage time; detailed description of management and control methods according to assessed characteristics (radioactivity, acidity, etc.);
- emissions of radioactive dust (source, characteristics, quantity) and the prevention methods adopted by the proponent; technical characteristics and underground ventilation;
- nuisance sources (noise, odours, etc.) and the associated facilities and equipment;
- means taken to prevent wind and water erosion of ore/waste rock stockpiles;
- energy-generating equipment, including its location, generating capacity, etc.;



- garages, sheds, warehouses (hydrocarbons and other products), concrete plant, etc.;
- all related activities or work, whether permanent or temporary, including roads, watercourse crossings, deforestation;
- installation, repair or modification of culverts and any work or activities planned below the natural high water mark.

### **3.3.3 Waste rock management**

The proponent will compare potential waste rock storage areas from a technical, economic and environmental perspective in order to make an informed decision on the preferred site. The proponent must demonstrate that the rules of good practice were followed and that the proposed infrastructure for adequate waste rock management affords the greatest environmental protection.

This section of the impact statement must include the following information:

- a detailed description of the planned methods for managing and controlling waste rock based on the determined characteristics (tailings that are acid-generating, radioactive or entail a high risk, etc.);
- estimated surface area and capacity of required waste rock stockpiles, justification for the final site selection, including hydrogeological conditions and drainage;
- geographical location of the site in relation to nearby watercourses and the inventoried uses or values (importance) of the receiving environment;
- minimum and maximum waste rock storage time;
- possibility of disposing of waste rock underground following exploration work.

### **3.3.4 Water management**

The proponent must provide a water budget that ensures maximum recirculation of water with a view to minimum discharge into the environment. It must identify and specify the location of drinking water supplies, the wastewater disposal method and the effluent discharge point. The planned measures for protecting against contamination of clean water entering the site must also be specified.

Special attention should be given to the treatment of elements that may be associated with uranium based on the mineralogy and known history of uranium mining (radionuclides, selenium, molybdenum, etc.). The proponent must identify metals requiring special monitoring during final-effluent treatment.

#### *3.3.4.1 Water budget*

The impact statement must include a complete balance sheet of water used and discharged (in m<sup>3</sup>/day and m<sup>3</sup>/yr) in driving the ramp and drifts and in services provided on the entire mine site. The balance sheet must be detailed and cover one full year of operation to take into account seasonal variations.

More specifically, the proponent must include the following information:

- water supply sources for exploration work, indicating required volumes and catchment works;
- household water needs;
- description of the flow pattern and rates of water used in extraction operations, specifying circulation and recirculation systems and providing a table showing daily and annual rates of water consumption and the use of water for these operations;
- uncontaminated runoff entering the water management system on the mine site.

#### 3.3.4.2 Contaminated water treatment and discharge

##### **Treatment**

The proponent must define and justify the methods used to treat all mine and household wastewater (sedimentation, chemical and biological treatment, etc.) as well as describe treatment techniques in detail, including:

- physico-chemical characteristics of wastewater to be treated;
- design criteria and maximum treatment capacity, anticipated efficiency (percent pollutant reduction, toxicity level, etc.);
- list of and data sheets for chemical products used, their points of addition and quantities used. The proponent may also verify whether the input chemicals are covered by government programs;
- holding time and capacity of ponds, characterization and management of treatment residues (sludge, etc.) and characterization of sites where treatment residues will be stored, etc.;
- volume and management of treatment by-products.

##### **Final effluent**

The impact statement must contain the following information relating to final effluent:

- predicted mean daily effluent flows and volumes;
- an appropriate-scale map showing the location of all effluent discharge points for treated mine water and a description of the receiving environment and measures to prevent erosion;
- description of final effluent discharge techniques (piping, conduits, pumping, diffuser);
- location and description of the measurement site, including flow measuring devices.

The proponent must indicate the minimum distances planned between watercourses (including wetlands) and access roads and ore and waste rock stockpile areas to prevent contamination of the aquatic environment from surface runoff and dust emission. The proponent must also include a calculation of environmental discharge objectives (EDO) for final effluent from its project and show that the calculation has been validated by the authorities concerned.

### **3.3.5 Borrow pits and quarries**

The proponent must indicate the location of as well as map all existing and planned borrow pits and quarries, specifying access roads, surface areas and the required amount of borrow material, taking into account material required for maintenance needs of the project. The proponent must explain how optimum use of borrow material has been ensured. The impact statement must contain enough information to determine the proponent's actual needs and possible alternatives. The criteria used to decide on borrow pits and quarries must include the ecological value of the areas in question and the costs associated with alternatives. The proponent must describe possibilities for using the rock from ramp excavation.

Lastly, this section must include an overview of site decommissioning and rehabilitation measures.

### **3.3.6 Related infrastructures**

The proponent must give the historical background to existing infrastructures and describe related infrastructures required for this project, indicating whether they are public or privately owned and whether any will also be used for purposes other than those required by the project or are liable to be reused after the project has been completed (for example, by the tallyman). The predicted life of infrastructures and, if applicable, planned decommissioning work must also be described.

The following infrastructures must be described in greater detail.

#### *3.3.6.1 Access routes*

The proponent must describe the existing road network in the exploration zone, taking into account known and frequently used snowmobile trails (Cree or otherwise) or ATV trails.

While ensuring that these infrastructures comply with the *Regulation respecting standards of forest management for forests in the domain of the State*, particularly in the area of ensuring the free passage of fish and maintaining the navigability of waterways, the proponent must describe the technical characteristics and principal work to be carried out to repair and build the planned access roads.

#### *3.3.6.2 Lodging*

The proponent must specify the location, layout and components of lodging facilities for the exploration phase of the project, including foreseen modifications. It must indicate whether facilities already exist and, wherever possible, use existing sites. The information in this section must include the accommodation capacity and duration and periods of use of lodging facilities, and the proponent must highlight the anticipated environmental impacts of these facilities.

The proponent must provide the following information:

- drinking water supply facilities;

- means of wastewater management, discharge areas, dilution rates following treatment;
- types and quantities of residual materials generated and how effectively they can be managed with existing facilities;
- waste disposal methods and sites, anticipated quantities, location and state of existing or future management sites, life of the site and planned facilities;
- recycling program;
- energy supply;
- source of borrow material and type of material required for development;
- management of any other infrastructure required for the camp that might have an environmental impact (garage, gas station, warehouse, etc.).

### *3.3.6.3 Residual materials, fuel and hazardous material storage sites*

The proponent must specify the location and nature of structures, equipment and facilities for storing and containing residual materials, fuel and hazardous material (chemical products, explosives, radioactive materials), indicating the quantity of each product for each structure, piece of equipment and facility. The proponent must demonstrate compliance with the laws and regulations in effect and explain the planned preventive and emergency measures.

The planned means for recovering or disposing of outdated products (tires, etc.), equipment or machinery, or environmentally harmful material (batteries, barrels, tanks, etc.) must be explained. Taking into account the remaining capacity of the site in relation to the authorized capacity, the proponent must assess the option of disposing of waste on an approved disposal site elsewhere in the region or burning it in an incinerator. More specifically, the proponent must estimate the quantity of residual radioactive material (contaminated material, etc.) that will be produced and describe how it will be managed.

### **3.3.7 Labour requirements**

For each mining component, the proponent must explain the construction and operating schedules, distribution of labour and the skills required for each job group. A description of labour must be provided for each project phase, placing emphasis on employment opportunities for Crees. The proponent must also include a description of company policies respecting local hiring and on-the-job training.

This section must also specify language requirements and the planned measures for facilitating the hiring of Crees.

The proponent will indicate the exact location of lodging facilities, as well as the accommodation capacity, length and periods of use of facilities.

## **3.4 Description of the Biophysical and Social Environments**

This section of the impact statement delineates the study area and describes the components of the biophysical and human environments relevant to the project (baseline

radiological conditions, current radiation exposure of the populations concerned, Cree use of the area for traditional pursuits, etc.). The environmental and socioeconomic parameters of mining development in the region must also be explained.

### **3.4.1 Delineation of the study area**

The proponent must define a study area and justify the boundaries, taking into account the areal extent of anticipated impacts and the appropriate ecological boundaries for the various environmental components. If necessary, the study area may consist of various sectors delineated according to the impacts studied. It must be large enough to encompass all planned activities, including project-related activities, and all direct and indirect environmental and social impacts of the project.

The study area should include the site itself and describe the local as well as regional environment. The regional environment should include control sites for the purposes of comparing project impacts and natural variations in various environmental components.

### **3.4.2 Description of relevant components**

The proponent must describe the state of the environment in the study area prior to the carrying out of the advanced exploration project (at time zero). The biophysical and human components liable to be affected by the project must be described on the basis of qualitative and quantitative inventories so as to identify and delineate potentially sensitive elements. The inventories must reflect the social, cultural and economic values of surrounding populations, particularly Cree, in relation to the described components as well as take into account the land use cycle of Cree hunters affected by the project. If the data available at government, municipal or other bodies are insufficient or not up to date, the proponent must round them out by conducting its own inventories or surveys following the rules of good practice. Any information that will facilitate the understanding or interpretation of data (survey methods and dates, location of sampling stations, etc.) must be included in the impact statement.

#### *3.4.2.1 Biophysical environment*

### **Geology, climate and hydrogeology**

The principal geological formations in the project area must be identified on maps drawn to an appropriate scale. The proponent must describe the geomorphology of the region. The geological description must include such information as fracturing, *in-situ* constraints and geomechanical properties. The location of zones prone to erosion and ground movement as well as of likely borrow areas must be indicated. Drawing on the most recent knowledge, the proponent should identify natural hazards such as earthquakes, land subsidence, landslides, high water and floods, etc.

The direction of prevailing winds, average and maximum 10-year precipitation and, if available, return periods, as well as annual evaporation (cm) must also be indicated, specifying the data sources and calculation methods used.

Given that this is an underground exploration project, the hydrogeological context must be defined and described, including aquifers, water quality and susceptibility to pollution, etc.

### **Hydrous environment and wetlands**

The proponent must describe the drainage pattern and wetlands in the study area, placing emphasis on drainage and surface runoff. To accurately define the local drainage pattern and boundaries of drainage basins, the proponent must include a detailed map enabling identification and assessment of basin and sub-basin areas and drainage network configuration. Continuous and intermittent streams shall be identified as such, and wetlands shall be classified (e.g. bogs).

This section of the impact statement must include a description of the physical and physico-chemical characteristics, inventoried uses and water balance (flow, bathymetry, etc.) of watercourses in general and, in particular, those that currently receive or will receive effluent or could be affected by any of the project components (permanent or temporary). The standard limnological parameters (sediment, mean and maximum depth, surface-volume-perimeter ratios) shall be discussed for lakes.

To the extent that the proponent envisages the production of metals other than uranium, even trace amounts, or considers that such metals may affect the toxicity of mine effluent, their concentrations in receiving waters must be determined. It is recommended that analysis techniques (e.g. ICP-MS scan) be used to detect trace elements present during sampling campaigns to determine background levels in receiving waters and groundwater.

### **Vegetation**

Using maps, the proponent must provide a detailed description of the vegetation cover, including the presence of fragile or exceptional plant communities or habitats in the study area. The surface areas to be logged and any rare, threatened or endangered species liable to be affected by the work must be identified. The proponent can consult the competent government authorities for this purpose. It must also give the forest fire history of the area and indicate burned areas.

### **Wildlife**

The proponent must include a map depicting all terrestrial and aquatic habitats (dens, wintering areas, spawning grounds, nesting sites, etc.) found in the study area and explain the value they hold. Special attention must be given to sites providing suitable habitat for fish and game. An attempt must be made to define habitat quality indicators based on the species present and their sensitivity to radioactive material (for instance, the scientific literature cites mollusks as good indicators of radiological contamination).

Where necessary, rare or threatened species must be identified, taking into account their current or contemplated protection status. The proponent shall consult the appropriate government agencies in this regard.

### **3.4.2.2 Human environment**

This section of the impact statement must situate the mining project in relation to communities liable to be affected. The human environment includes both Cree and non-Aboriginal communities in the study area. The proponent must document the various aspects of the way of life of the people inhabiting the study area, including community life, land use and the social fabric. As needed, it can examine other elements deemed pertinent for project assessment in addition to those mentioned below. Where possible, reference should be made to other uranium exploration projects in Canada.

#### **Human health**

The level of exposure of the local population to nuclear substances must be taken into account when assessing the project's human health impacts. The proponent must describe how the principal components of the assessment will be presented, i.e. identification of potential contaminants (especially radiological contaminants) and exposure pathways (sources, mechanisms, effects), human groups potentially exposed to those contaminants, the method used to estimate exposure levels, doses of radiation received by exposed individuals, and the criteria used to evaluate exposure levels.

#### **Socioeconomic aspects**

The impact statement must contain a demographic profile and discussion of the economic situation of communities in the study area (jobs, employment opportunities, sectors of activity, income sources, etc.). The proponent must also describe the regional labour pool and companies, especially Cree, qualified to fill jobs or perform contracts for the planned mining operations and project construction, and explain how it plans on training, hiring and integrating Crees into the workforce.

#### **Heritage and archaeology**

The proponent must describe all prehistoric, historic and spiritual sites in the study area, as well as sites of special interest, such as burial grounds, sacred and favoured sites. In addition, studies must be conducted to determine the archaeological potential of the area based on criteria established by the competent government organizations. This means identifying known archaeological sites, areas with archaeological potential and other elements of heritage interest.

#### **Occupation of the territory**

The impact statement must describe current occupation of the territory, including the following information to be gathered during consultations with the appropriate stakeholders:

- tenure and boundaries of Category I, II and III lands;
- occupation of the territory by Crees and non-Aboriginal people (mining or forestry operations, outfitting operations, wildlife reserves/sanctuaries, vacation leases, etc.);
- mineral potential and existing mining rights and leases in the territory;

- recreational-tourism products in the study area;
- location and description of dwellings, erected structures and various buildings located near the project;
- existing services and infrastructures within and on the edges of the project area (camps, power transmission lines, etc.);
- Cree and non-Aboriginal land use;
- traditional hunting grounds in the study area, including associated infrastructures (roads, portages, camps, etc.);
- traditional travel routes and when they are used by families whose hunting grounds will be affected by the project and by the residents of Mistissini;
- designated protected and conservation areas (temporary or final status) and other proposed protected areas.

The impact statement should include a synthesis map showing the significant elements of occupation covered by the assessment.

### **3.5 Environmental and Social Impact Assessment**

This section of the impact statement must evaluate the probable environmental and social impacts of the Matoush uranium exploration project. The evaluation must identify the anticipated impacts over the short, medium and long terms, as well as their significance. Elements of the planned mining phase that could affect the environmental or social acceptability of the current project should also be highlighted. The analysis must be based on the previous descriptions of the project and receiving environment. The impact statement must explain the impacts and assess their significance using an appropriate method and appropriate criteria. The positive and negative, direct and indirect impacts and, where applicable, the cumulative, synergetic and irreversible impacts of the project must be considered. This assessment will serve to establish thresholds or levels of acceptability, as well as determine impact mitigation objectives and monitoring and follow-up needs.

Assessing the significance of an impact depends first and foremost on the component affected, i.e. its intrinsic value for the ecosystem, as well as on the social, cultural, economic and visual values attributed to these components by the local population. The more a component of the ecosystem is valued by the population, the more the impact on this component is likely to be significant. The basic concerns of the population, in particular when elements of the project pose a significant health or safety risk or a threat to archaeological sites, will influence how significant an impact is considered to be.

Variations in the extent, frequency, duration or intensity of an action or effect may also influence the significance of an impact. These variations can alter the significance of the changes to affected environmental components in a positive or negative manner. As the case may be, the impact must be put in perspective and situated in spatial (study area, region, province, etc.) or temporal (e.g. loss of biodiversity) terms.

The impact statement must describe the method used to assess impacts as well as the related uncertainties or biases. The methods or techniques employed must be objective, concrete and reproducible. The reader must be able to easily follow the proponent's reasoning in determining impacts. The proponent must discuss project activities and



structures in relation to the surrounding environment using summary tables, checklists or impact fact sheets. To enable a full understanding of the environmental and social impacts, the information in this section must be supported by schematic representations (plan view, map, etc.) of points of releases into the environment, the valued components of the biophysical and human environments affected, such as rare, threatened or endangered species, species hunted or fished by the Crees, etc.

### **3.5.1 Impacts on the biophysical environment**

Changes in natural conditions and environmental losses must be assessed based on occurring resources, land occupation and use, the purpose of sites and the carrying capacity of ecosystems (e.g. analysis of the short, medium and long-term impact of runoff from waste rock stockpiles and sewage sludge on the hydrous environment). Special attention shall be given to describing the impacts associated with radioactivity (radioactive effects). The proponent must also determine irreversibility thresholds for all impacts, taking the following aspects into account:

#### **Air and soil quality**

- drainage and erosion from wind or runoff;
- increase in dust emission from ground transportation;
- radioactive contaminants liable to be emitted into the atmosphere;

#### **Hydrous environment**

- permanent or temporary alterations in the aquatic environment as a result of work;
- quality of water bodies receiving any effluent;
- radioactive contaminants liable to be released into the hydrous environment;
- possible alterations in the local hydrology (surface and groundwater) caused by dewatering and the keeping dry of the ramp and underground facilities;

#### **Vegetation**

- fragile or exceptional plant communities and rare, threatened or endangered species liable to be affected by the project;

#### **Wildlife**

- maintenance of fish populations and habitat, taking into account possible chemical and radiological toxicity of effluent and the life cycle of the species concerned;
- free movement of fish;
- effects on the aquatic or terrestrial environment of an accidental hazardous spill;
- survival and movement of terrestrial wildlife and bird life as well as the loss of preferred habitat or possible destruction of rare, threatened or endangered species, taking into account precedents set by uranium mines;
- effects on the population dynamics and behaviour of wildlife and impacts of environmental toxicity on wildlife and wildlife habitat.

### **3.5.2 Impacts on the human environment**

The proponent must determine and assess all potential human impacts of the project so as to identify the major issues at stake. A comprehensive assessment must be made of the probable changes to the way of life of communities inhabiting the study area, while considering how those impacts are seen by land users. The proponent must discuss the benefits Cree communities will derive from the project compared with the negative impacts and perceptions that will affect the Crees. As much as possible, the proponent must refer to other projects of this type in Northern Québec and past experiences elsewhere in Canada.

A minimum of the following impacts must be discussed in this section:

#### **Human health**

- effects of contaminants (radioactive and metals) in traditional food, water and air;
- radiation doses likely to be received by the exposed population, including workers, as a result of the project;
- proposed mitigation measures;
- Environmental impacts of an accidental radioactive or chemical spill;

#### **Quality of life and culture**

- nuisances from noise, dust, etc.;
- effects of lengthy absences on Cree workers' family life;
- Cree perception and fears with regard to possible environmental contamination (radioactive or other), in particular from deposition of dust in water bodies from ground transportation;

#### **Economic benefits**

- for each project phase, the number and type of temporary and permanent jobs created for Crees and non-Aboriginal people;
- availability of skilled labour or workers who can be trained, taking into consideration the subsequent phases of the uranium project as well as other mining projects in the same area, whether underway or foreseen;
- the nature of training programs to be established, if applicable, in collaboration with the Cree Regional Authority's Human Resources Department;
- contracts granted to Cree people and companies;
- predicted short and long-term economic benefits for local companies;
- job or economic losses for local companies whose activities would be affected by the present project;
- development prospects in related sectors for local or regional communities;
- development outlook for recreational-tourism products for this region and surrounding areas as well as the potential positive or negative impacts of the present development project on future development in this sector of activity;

### **Land use**

- impact of infrastructures on Cree land use and traditional travel routes, particularly on the project site;
- changes to traditional hunting and fishing activities in the study area;
- wildlife use by sport hunters and fishers;

### **Heritage and archaeology**

- impact on prehistoric, historic and spiritual sites in the study area, as well as sites of special interest, such as burial grounds, sacred or favoured sites, and archaeological sites.

### **3.5.3 Cumulative impacts**

The proponent must identify and put into perspective the potential cumulative environmental and human impacts of the project combined with the effects of other work or activities currently being carried out or that can be reasonably foreseen in the same area as the project, taking into consideration natural phenomena such as burn sites, prescribed burning, etc. Cumulative impacts should be determined based on literature dealing with similar projects carried out elsewhere in Canada or around the world. A minimum of the following components must be considered for this purpose:

- endangered wildlife and plant species;
- quality of life of the Cree people;
- Cree land use;
- creational-tourism activities, including sport hunting and fishing.

### **3.6 Mitigation and Remediation Measures**

The proponent must describe the planned measures for maximizing the positive environmental and social impacts of the project as well as the planned corrective measures for minimizing its negative impacts. The proponent shall include an overview of the measures taken to prevent anticipated impacts on environmental contamination (surface and groundwater, etc.), erosion, radioactive contaminants liable to be released into the environment and any other impact identified during impact assessment.

Special attention must be given to the following measures:

- measures to mitigate the impact of radiation exposure of the public, including workers;
- specific environmental protection clauses in the various contracts awarded;
- restoration and remediation standards for quarries and borrow pits and, if applicable, parts of decommissioned roads and disturbed sites;
- sensitization of workers on the jobsite to hunting and fishing rights and customs in the territory covered by treaties and measures to ensure that those rights and customs are respected;
- protection of archaeological sites;
- use of Cree labour or contractors during preparatory and exploration work.

As regards mitigation measures for the advanced underground exploration, the proponent must explain the measures implemented during the exploration phase (including temporary work stoppage) separately from those to be applied during decommissioning of the mine site. In particular, the proponent shall describe:

- containment and monitoring procedures during temporary shutdowns (including access to the underground ramp);
- restoration plan, including restoration of tailings sites, redevelopment of waste rock stockpiles and their stabilization to combat erosion from wind or runoff in the event of early work stoppage;
- possibility of using overburden for restoring decommissioned sites;
- recovery of certain equipment and facilities.

Lastly, the proponent must explain the nature and significance of residual impacts subsequent to implementation of mitigation measures. Development and compensation proposals and commitments for offsetting the loss of wildlife habitat must be made.

### **3.7 Management of Accidents and Malfunctions**

Given the remote location of the mine site, the proponent is responsible for initial response to technological disasters, malfunctions, spills, natural disasters, etc. The impact statement must discuss the proponent's emergency response capability, handling procedures and communication plan. If applicable, the proponent must provide its code of practice for serious accidents. It must describe the sources, quantities, mechanisms, characteristics and consequences of contaminants and materials (physical, chemical or radiological) liable to be released into the environment during accidents and malfunctions. The impact statement must discuss the proponent's emergency response capability and handling procedures in the following cases:

- transportation of radioactive material or chemical products (petroleum products, explosives, etc.) or material or products deemed potentially hazardous;
- radioactive spill on the roadside or mine site, placing emphasis on rapid response and on-site response techniques;
- oil or toxic spill on the roadside or mine site, placing emphasis on rapid response and on-site response techniques;
- storage of chemical/petroleum products and dangerous goods;
- fire risks on the roadside, mine site or camps built during the construction and exploration phases;
- potential natural disasters identified for the project (weather and climate events, earthquake, etc.).

The proponent must evaluate the incidence or probability of such accidents and include a detailed explanation of the proposed restoration methods for each situation.

### **3.8 Monitoring and Follow-up Programs**

The proponent must describe its planned environmental management program (compliance with standards, code of good practice, etc.) based on the environmental and

social impacts defined during the study. The program must ensure implementation of the identified mitigation measures and that possible legislative and regulatory requirements or conditions are met. The proponent must indicate whether monitoring and follow-up will be carried out in-house or contracted out (specialized firm) and to what extent they could be carried out by Cree-owned companies.

The program must be in place and make it possible to characterize the environment before project-related activities begin. A reference state must be defined for the purposes of assessing the project's long-term impacts (background levels, monitoring devices, indicators). The impact statement must set forth sampling frequency and methods and analyzed parameters (activity of selected radionuclides, aquatic invertebrates, etc.), as well as identify the planned measures relating to biophysical (fish, birds, wildlife and their habitats, plant species, hydrogeology, etc.) and socioeconomic components. The proponent must also explain how it intends to comply with the prescribed standards regarding public exposure, including workers, to nuclear material generated by the project.

Using methods recommended by experts in the field, the proponent must determine the minimum level of radiological contamination *in situ* before work begins and characterize element fluxes in the Matoush site environment, taking into consideration documented cases of potential contamination from metals associated with uranium exploitation (selenium, molybdenum, etc.). The proposed follow-up program must reflect the proponent's understanding of the reference state of radiological levels in the study area (e.g. characterization of surface water and sediment, sedimentary profile, etc.). The results of characterization must be compared with the applicable criteria.

In addition, the proponent must include a detailed description of its planned protocols for characterization of wastewater, soil and air emissions, including the installation and number of observation wells required to monitor groundwater quality, taking into account such things as acid mine drainage and leaching potential, toxicity and wind erosion at waste rock and ore stockpile areas. Special attention must be given to radioactive contamination of water, soil and air.

Runoff from the mine site and waste rock/ore piles must be analyzed and the effects of treated effluent on the receiving environment, monitored. This sampling effort must enable an accurate assessment of foreseen and accidental impacts and the effectiveness of mitigation measures in offsetting the adverse effects of tailings. The proponent must also specify the quality control measures related to analyses.

Measures for monitoring the economic benefits of the project for local communities, notably Cree, must be put forward.

These measures are an integral part of the project and should aim to provide knowledge of real events which occur as a result of this type of development in the North.

### **3.9 Public Consultations**

The impact statement must include a section discussing and assessing all consultations held during planning and conducting of the environmental and social impact study for the Matoush uranium exploration project. The proponent must explain the communications established between it and the Aboriginal and non-Aboriginal communities concerned,

along with the outcome of exchanges with Crees who harvest wildlife in the project area. The purpose is to determine exactly how the project, its impacts and the proposed mitigation measures are perceived at the local level.

The proponent must adopt a communications plan that initiates consultation of all parties concerned (individuals, groups, communities, government departments and public and parapublic organizations, particularly those based in the administrative regions concerned) at the beginning of the impact study. It is important that consultations begin as early in the process as possible so that all parties have input and their input serves to accurately determine the issues to be studied, alternatives and decision criteria. The elements of the communications plan that will be deployed during the carrying out of the project must be explained.

#### **4. PRESENTATION OF THE IMPACT STATEMENT**

These directives are intended as guidelines to help the proponent conduct an environmental and social impact study of the Matoush uranium exploration project and prepare an impact statement that satisfies Québec and federal government requirements.

The methods used relate to the decision-support function of environmental assessment and make it possible to assess project impacts and their significance as well as structure the content of the impact statement so that readers can more easily find information and consult the document.

The proponent must provide 15 copies of the impact statement, a non-technical summary and supporting documents (sectoral studies, etc.) in French, 10 copies of the impact statement and summary in English, and 2 copies of the impact statement in PDF (Portable Document Format).

## **THE FEDERAL EVALUATION AND REVIEW PROCESS UNDER SECTION 22 OF THE JAMES BAY AND NORTHERN QUEBEC AGREEMENT**

### **ANNEX TO THE DIRECTIVE**

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This Annex complements the directive issued by the Federal Administrator and includes recommendations to assist the project proponent with preparing the Impact Statement. These recommendations are primarily from the Canadian Nuclear Safety Commission (CNSC).

### **PROJECT DESCRIPTION**

#### **Treatment and removal of contaminated water**

Once the list and data sheet of chemical products used is compiled and is compared with the applicable standards and government programs as requested under section 3.3.4.2 of the directive, the project proponent is encouraged to also verify if the chemical substances are subject to the Government of Canada's Chemicals Management Plan (see references).

### **DESCRIPTION OF THE BIOPHYSICAL AND SOCIAL ENVIRONMENT**

#### **Geology, climate and hydrogeology**

Under section 3.4.2.1 of the directive, the project proponent is required to use the most up to date information to identify natural hazards. The CNSC suggests the project proponent use the most recent seismic hazard model (Adams and Atkinson, 2003) and incorporate it into the 2005 National Building Code of Canada (<http://earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index-eng.php>) to determine the specific seismic risk to the site.

If another method is used, the project proponent must demonstrate how the selected approach exceeds or is more appropriate than the suggested method.

### **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT**

#### **Impacts on the biophysical environment**

From the characterization study on the impacts of radioactive effects (s. 3.5.1), the project proponent must evaluate the short-, medium- and long-term effects of the radioactive contaminants and other contaminants that could potentially be released in the water source from waste rock piles. For the long-term assessment, the project proponent must become familiar with the G-320 Regulatory Guide from the Canadian Nuclear Safety Commission "Assessing the long-term safety of radioactive waste management" (see references).

As well, to correctly identify the impacts associated with radioactive effects, the project proponent must consider the Priority Substances List for the releases of radionuclides (Environment Canada and Health Canada 2003), and also the most recent PROTECT reports from the European Commission (Andersson et al. 2008 and Beresford et al. 2008).

## REFERENCES OF INTEREST

The following references were either cited in this Annex or listed here because of their relevance to the assessment of the effects that is to be prepared by the project proponent.

Adams and Atkinson, (2003) Development of seismic hazard maps for the proposed 2005 edition of the National Building Code of Canada. *Can. J. Civ. Eng.* 30(2): 255–271

Andersson, P., Beaugelin-Seiller, K., Beresford, N. A., Copplestone, D., Della Vedova, C., Garnier-Laplace, J., Howard, B. J., Howe, P., Oughton, D.H., Wells, C., Whitehouse, P. (2008) Numerical benchmarks for protecting biota from radiation in the environment: proposed levels, underlying reasoning and recommendations. *Protection of the Environment from Ionising Radiation in a Regulatory Context (PROTECT)*, European Commission, <http://www.ceh.ac.uk/PROTECT/outputs/>

Beresford N.A., A. Hosseini, J.E. Brown, C. Cailles, D. Copplestone, C.L. Barnett, K. Beaugelin-Seiller (2008) Evaluation of approaches for protecting the environment from ionising radiation in a regulatory context, *Protection of the Environment from Ionising Radiation in a Regulatory Context (PROTECT)*, European Commission., <http://www.ceh.ac.uk/PROTECT/outputs/>

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([http://seismescanada.rncan.gc.ca/hazard/interpolator/index\\_f.php](http://seismescanada.rncan.gc.ca/hazard/interpolator/index_f.php))

Commission Canadienne de la Sûreté Nucléaire (2006a). Guide d'application de la réglementation. Guide G–320. Évaluation de la sûreté à long terme de la gestion des déchets radioactifs.  
[http://www.nuclearsafety.gc.ca/pubs\\_catalogue/uploads\\_fre/G-320\\_FinalPaper\\_f.pdf](http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads_fre/G-320_FinalPaper_f.pdf)

Commission Canadienne de la Sûreté Nucléaire (2006b). Key Lake Present Operations Cumulative Effects CNSC Staff Determination of Environmental Risk. August 2006. CNSC, Ottawa ON. CNSC EDOC #3238507.

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[http://www.chemicalsubstanceschimiques.gc.ca/interest-interet/index\\_f.html](http://www.chemicalsubstanceschimiques.gc.ca/interest-interet/index_f.html)

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# **Appendix 3**

## **Instructions to FRP-S**



Canadian Environmental Assessment Agency    Agence canadienne  
d'évaluation environnementale

President

160 Elgin St., 22nd floor  
Ottawa ON K1A 0H3

Président

160, rue Elgin, 22e étage  
Ottawa ON K1A 0H3

Benoit Taillon  
Chairman, FRP-South  
2308 Sherbrooke East  
Montreal QC H2K 1E5

Dear Mr. Taillon:

Under section 22 of the *James Bay and Northern Quebec Agreement* (JBNQA) and following the recommendation of the Evaluating Committee (COMEV), I am instructing the Federal Review Panel – South (FRP-Sud) to conduct an environmental and social impact assessment of the Matoush underground uranium exploration project, located on James Bay territory near the Otish Mountains. You will find attached the directive I forwarded to the proponent along with an annex containing complementary information to assist with the preparation of the impact statement.

This project, which is considered to fall under federal jurisdiction, is subject to the federal assessment and review process under section 22 of the JBNQA. I have therefore asked the proponent to forward copies of the impact statement to your secretariat, as soon as it is completed. This project also triggers the *Canadian Environmental Assessment Act* (the Act), under which the Canadian Nuclear Safety Commission (CNSC) is required to issue its authorization under the *Nuclear Safety and Control Act*. Your recommendation will also be used in the decision process under the Act.

I thank you in advance for your cooperation in this matter.

Yours sincerely,

*Original signed*

Peter Sylvester  
Federal Administrator  
James Bay and Northern Quebec Agreement

Enclosures

Canada



Canadian Environmental Assessment Agency    Agence canadienne  
d'évaluation environnementale

President

Président

160 Elgin St., 22nd floor  
Ottawa ON K1A 0H3

160, rue Elgin, 22<sup>e</sup> étage  
Ottawa ON K1A 0H3

Benoit Taillon  
Chairman, FRP-South  
2308 Sherbrooke Street East  
Montreal QC H2K 1E5

Dear Mr. Taillon:

This is further to a request from the President of the Canadian Nuclear Safety Commission (CNSC), Michael Binder, dated September 10, 2010, that the activities for the completion of the comprehensive study of the Matoush uranium exploration project be delegated to the Federal Review Panel – South (FRP-S). In keeping with this request, as Federal Administrator, I am therefore instructing FRP-S, in addition to its mandate under section 22 of the *James Bay and Northern Quebec Agreement*, to conduct the review and produce the comprehensive study report, including public consultation sessions, in compliance with the requirements of the *Canadian Environmental Assessment Act* (the Act).

The delegation of the environmental assessment is pursuant to section 17 of the Act, which stipulates that the responsible authority for a project may delegate the preparation of any part of the screening or comprehensive study of a project, *as well as the corresponding reports, and may delegate any part of the design and implementation of a follow-up program but shall not delegate the duty to take a course of action pursuant to subsection 20(1) or 37(1) of the Act.* Subsection 17(2) stipulates that the responsible authority shall ensure that the delegated duties or functions are performed in accordance with this Act and the regulations.

Mr. Binder also specified as part of his request that the results of the public consultations conducted by FRP-S within the context of the review along with the final recommendations report be used in the CNSC decision process for issuing a licence in accordance with the *Nuclear Safety and Control Act*.

... / 2

Canada 

- 2 -

The scope of the FRP-S review should henceforth include, in addition to the exploration ramp, the site access road, borrow pits greater than 3 hectares that were subject to an impact statement by the proponent, and the contaminated waste storage site. The assessment of cumulative effects shall also take into consideration the permanent air strip that is currently under construction. The CNSC has forwarded a request for additional information to the proponent so as to complete its evaluation of these components. The information provided by the proponent was included in the report submitted on August 11, 2010, to the attention of FRP-S. Given that the Provincial Administrator has decided to exempt several of these components from the provincial JBNQA review process following the recommendations of the Evaluating Committee (COMEV), I would urge FRP-S to discuss with the CNSC the best ways of determining the appropriate level of effort required to document and review these components.

As the Federal Administrator, I therefore approve the request by the CNSC to delegate the comprehensive study to FRP-S, and hereby instruct FRP-S to prepare the said study in accordance with the terms specified above. Also, given that the recommendations report produced by FRP-S will be used in support of my decision as Federal Administrator and to satisfy the requirements of the Act, including those in sections 16 (1) and 16 (2), I am relying on FRP-S to work in close cooperation with the CNSC and the relevant federal departments and to forward a copy of the final report upon completion of the review to the president of the CNSC, Mr. Binder.

Please note that the Canadian Environmental Assessment Agency will serve as federal coordinator for the environmental assessment of this project, and as such, will be your point of contact with the CNSC and federal authorities.

I thank you in advance for your collaboration in the completion of this essential review.

Yours sincerely,

*Original signed*

Elaine Feldman  
Federal Administrator  
James Bay and Northern Quebec Agreement

c.c.: Michael Binder, President, Canadian Nuclear Safety Commission  
Isaac Voyageur, Director, Environment, Cree Regional Authority

# **Appendix 4**

## **Tour of the Matoush Site Facilities**



**Facility Visit  
Matoush Site  
September 17, 2010**

# Permanent Airstrip



Dimensions: 1400 metres x 30 metres  
Expected completion date is November 2010  
Located 6 kilometres from the camp  
Material from borrow pits DT 19–20.



# Water Intake and Future Mining Effluent



Water intake on Lac  
Matoush (5):  
200 litres/person/day  
650 metres from future  
effluent



Location of final effluent

# Diesel Tanks and Generator



Generator with 300 kilowatts of power for the camp



Seventeen diesel tanks next to the camp

# Camp

Rooms and canteen for 30 to 75 people  
Thirty to thirty-five people currently on the site (assembling infrastructure, surface drilling, maintenance, cooking, etc.)  
Four to five Cree (15%) are presently employed



# Air Sampling Station

NO<sub>x</sub>, SO<sub>2</sub>, SO<sub>x</sub> analysis  
Radon and gamma radiation  
Data accumulated since June 2009



# Garages and Warehouses

Warehouse to store the material for the future portal structure



Garage and warehouse for vehicles



# Site of the Future Portal

Surface water runoff ditch



# Burial of Wastes and Temporary Storage of Contaminated Soil



Temporary storage site of 200-litre barrels of contaminated soil  
Located 500 metres from the camp  
Lined containment cell  
Soils (A-B/B-C) shipped to Chibougamau for burial



**Technical landfill sites—850 cubic metres**  
Mainly table waste

# Access Road



Regional winter road is practical from January to March



Access road constructed in 2009 connecting the airstrip to the camp



Existing access road connecting the camp to the regional winter road



## **Appendix 5**

### **Request for Additional Information by the Canadian Environmental Assessment Agency**



Agence canadienne  
d'évaluation environnementale

1141, route de l'Église,  
2<sup>e</sup> étage CP 9514 Succ. Ste-Foy  
Québec (Québec) G1V 4B8

Canadian Environmental  
Assessment Agency

1141 route de l'Église,  
2nd Floor, P.O. Box 9514, Stn Ste-Foy  
Quebec City, Quebec G1V 4B8

July 19, 2010

Guy Hébert  
President  
Strateco Resources Inc.  
1225 Gay-Lussac  
Boucherville QC J4B 7K1  
CANADA

**Subject: Federal environmental assessment – Matoush uranium exploration project**

Dear Mr. Hébert:

This is to inform you of the changes that will be made to the federal environmental review process for the Matoush uranium exploration project. On January 21, 2010, the Supreme Court of Canada (SCC) rendered a decision in *MiningWatch Canada v. Canada (Fisheries and Oceans)*. This decision had the effect of modifying how projects are scoped within the context of environmental assessments conducted pursuant to the *Canadian Environmental Assessment Act* (CEAA).

As a result, the environmental assessment will henceforth apply to all the activities and components of the uranium exploration project, whereas initially the federal review targeted only the underground ramp, related infrastructure and the mine camp site.

In addition, we would like to take this opportunity to inform you that in light of the Supreme Court of Canada (SCC) decision in *Attorney General of Quebec v. Grand Chief Ted Moses* rendered on May 14, 2010, the federal review process under section 22 of the James Bay and Northern Quebec Agreement (JBNQA) is no longer applicable as a substitute for the review process under the CEAA. The CEAA therefore applies fully in conjunction with the federal JBNQA procedure, and the project must be assessed via the comprehensive study process.

The Federal Environmental and Social Impact Review Panel - South (FRP-S) will continue its review of the project with support from the Canadian Nuclear Safety Commission (CNSC), as well as federal authorities. To maintain an efficient process and avoid any

... / 3

Canada

unnecessary duplication, a single recommendations report will be produced by FRP-S to satisfy JBNQA requirements as well as those specific to a comprehensive study under the Act.

Note that this change should not result in additional delays in the ongoing federal environmental assessment review process. Additional steps, however, will be needed to apply sections 21.3, 22 and 23 of the Act. The responsible authority is required to ensure that a comprehensive study report is submitted to the Department and the Canadian Environmental Assessment Agency (CEAA). This report shall then be subject to public consultations and a decision by Minister of the Environment.

To satisfy the requirements of the SCC decision of January 21, 2010, additional components will need to be incorporated into the environmental impact statement. Below you will find a list of the additional components that must be reviewed by the CNSC and federal authorities. This information is essential to the environmental assessment. To meet this request, you are encouraged to use the information that has already been submitted as part of the provincial environmental assessment or in the requests for exemption submitted by FRP-S.

#### **Request for additional information**

1. Please provide information relative to the Matoush mine camp permanent access road project prepared as part of the provincial review process as a supplement to the impact statement submitted to FRP-S and the CNSC.
2. Please provide a detailed description of the air strip project on the Matoush project site, the intended use of the air strip including frequency of use and air strip maintenance, along with the potential use of chemicals (e.g., de-icing products). Please also submit a rationale for this project, feasible alternatives, environmental effects, including those caused by accidents and malfunctions, cumulative effects, the extent of these effects, and planned mitigation and prevention measures.
3. Please provide a detailed description of the temporary contaminated soil storage site along with the rationale, feasible alternatives, environmental effects including those caused by accidents and malfunctions, cumulative effects, the extent of these effects, and planned mitigation measures. Please also indicate whether provincial authorizations are required for this project.
4. Please provide a summary of the information on the borrow pit project as a supplement to the information already included in the impact statement to COFEX and the CNSC. Please provide a project description that includes the location and volume of the borrow pits to be operated, as well as the transportation of materials and potential use of explosives.

The additional information provided in response to this request may be submitted to the Canadian Environmental Assessment Agency and may be attached to the document containing answers to the questions from FRP-S. Paper copies of the document must be submitted (including 10 copies in French and 5 copies in English), as well as an electronic version in both languages.

For any further clarification, please do not hesitate to contact me at 418-648-7831 or by email at [anne-marie.gaudet@ceaa.gc.ca](mailto:anne-marie.gaudet@ceaa.gc.ca).

Yours sincerely,

*Original signed*

Anne-Marie Gaudet  
Senior Advisor, JBNQA, CEAA

Email cc:

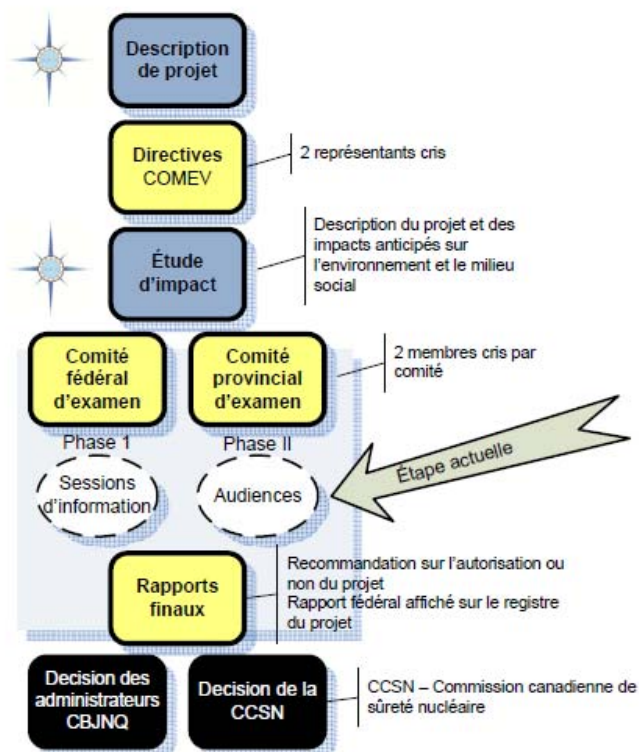
Caroline Hardy, Strateco Resources  
Marie-Pierre Grondin, CNSC  
Elaine Feldman, Federal Administrator  
Karine Menezes, HC  
Louis Breton, EC  
Andrew McIsaac, NRCan  
Judy Doré, DFO  
Benoit Taillon, COFEX

# **Appendix 6**

## **Public Hearings Documents (phases I and II)**



Convention de la Baie-James  
et du Nord québécois



Pour plus d'information, veuillez contacter :

**Michael O'Neill**  
Comité provincial d'examen  
418-521-3933 ext 7255  
[michael.oneill@mddep.gouv.qc.ca](mailto:michael.oneill@mddep.gouv.qc.ca)

**Benoît Thériège**  
Comité fédéral d'examen Sud  
418-648-7832  
[benoit.theberge@ceaa-acee.gc.ca](mailto:benoit.theberge@ceaa-acee.gc.ca)

## AUDIENCES PUBLIQUES PHASE II

SUR LE

PROJET D'EXPLORATION URANIFÈRE MATOUSH

PROPOSÉ PAR RESSOURCES STRATECO INC.

SOUS L'AUTORITÉ DES  
**COMITÉS PROVINCIAL ET FÉDÉRAL D'EXAMEN**  
DE LA CONVENTION DE LA BAIE-JAMES  
ET DU NORD QUÉBÉCOIS

**Chibougamau**  
**25 NOVEMBRE, 2010**

19H00-  
Hôtel Harricana  
1000, 3<sup>e</sup> rue  
Chibougamau (QC) G8P 1R7

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### **Webdiffusion**

Les audiences seront diffusées en direct via le site  
[www.ceaa-acee.gc.ca](http://www.ceaa-acee.gc.ca)



Convention de la Baie-James  
et du Nord québécois

## MANDAT DES COMITÉS D'EXAMEN

1. Examine l'étude d'impact produite par le promoteur, suivant la directive des Administrateurs de la CBJNQ;
1. Conduit les consultations publiques;
2. Fournit des recommandations aux Administrateurs quant à l'autorisation ou non du projet et aux conditions qui s'y rattachent

### Comité fédéral d'examen Sud (COFEX-SUD)

#### Représentants nommés par le Canada :

Président Benoit Taillon  
Anne-Marie Gaudet  
Claude E. Delisle

#### Représentants nommés par l'Administration régionale crie :

Philip Awashish  
Ginette Lajoie

### Comité provincial d'examen (COMEX)

#### Représentants nommés par le Québec :

Président Pierre Mercier  
Daniel Berrouard  
Robert Lemieux

#### Représentants nommés par l'Administration régionale crie :

Philip Awashish  
Brian Craik

## AUDIENCES PUBLIQUES – PHASE II

**Objectif : permettre au public d'exprimer son point de vue sur le projet et ses impacts et de présenter et/ou déposer des mémoires**

**Strateco Ressources Inc.** propose la construction d'une rampe d'exploration souterraine en vue de définir les ressources minérales avec plus de précisions et de déterminer la faisabilité d'une mine d'uranium.

### Comment participer ?

- Transmettre un mémoire par écrit et le présenter en audience ;
- Transmettre un mémoire par écrit sans le présenter en audience ;
- Exprimer verbalement une opinion en audience.

Les personnes qui désirent présenter un mémoire ou s'exprimer verbalement lors de l'audience sont invitées à informer le secrétariat du Comité fédéral d'examen (COFEX) ou du Comité provincial d'examen (COMEX) de leur intention, avant la tenue des audiences.

### Comment obtenir plus d'information ?

Sur l'examen du projet : [www.ceaa-acee.gc.ca](http://www.ceaa-acee.gc.ca)

Sur le promoteur Strateco Ressources Inc. et le projet :

[www.stratecoinc.com](http://www.stratecoinc.com)

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### **Webdiffusion**

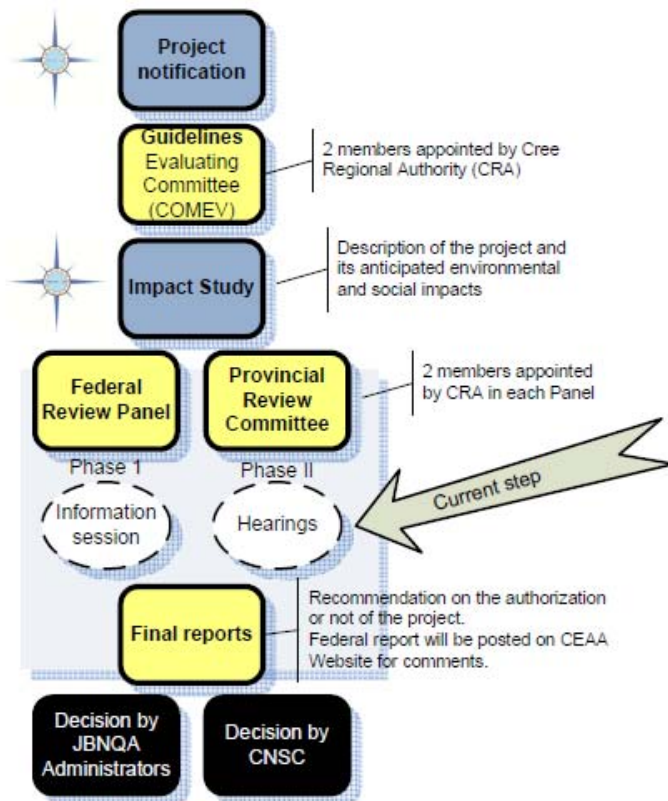
Les audiences seront diffusées en direct via le site

[www.ceaa-acee.gc.ca](http://www.ceaa-acee.gc.ca)



James Bay and Northern  
Quebec Agreement

## Section 22 REVIEW PROCESS



For more information, please contact:

**Michael O'Neill**  
Provincial Review Committee  
418-521-3933 ext 7255  
[michael.oneill@mddep.gouv.qc.ca](mailto:michael.oneill@mddep.gouv.qc.ca)

**Benoît Théberge**  
Federal Review Panel-South  
418-648-7832  
[benoit.theberge@ceaa-acee.gc.ca](mailto:benoit.theberge@ceaa-acee.gc.ca)

## HEARINGS PHASE II

ON THE

**MATOUSH URANIUM EXPLORATION PROJECT**

PROPOSED BY STRATECO RESOURCES INC.

CONDUCTED UNDER THE AUTHORITY OF THE  
**JBNQA FEDERAL AND PROVINCIAL  
REVIEW PANELS**

**Mistissini  
November 23, 2010**

**Starting at 6 pm**  
Neoskwekau Sports Complex  
206, Main Street  
Mistissini (QC) GOW 1C0





James Bay and Northern  
Quebec Agreement

## REVIEW PANELS' MANDATE FOR THE MATOUSH PROJECT

1. Review and analyse the impact study prepared by Strateco Resources Inc. following the Federal and Provincial Administrators guidelines
2. Conduct public consultations
3. Provide recommendations to the Administrators, whether or not the project should be authorized and under which conditions

### Federal Review Panel members

#### **Members appointed by the Government of Canada :**

Chairman Benoit Taillon  
Anne-Marie Gaudet  
Claude E. Delisle

#### **Members appointed by the Cree Regional Authority :**

Philip Awashish  
Ginette Lajoie

### Provincial Review Committee members

#### **Members appointed by the Province of Quebec :**

Chairman Pierre Mercier  
Daniel Berrouard  
Robert Lemieux

#### **Members appointed by the Cree Regional Authority :**

Philip Awashish  
Brian Craik

## HEARINGS PHASE II :

**Objective:** Provide an opportunity for the public to present their views and express their concerns on the project and its impacts and file written submissions to the review panels.

This exploration project was launched by Strateco Resources Inc. to identify mineral resources with more precision and to determine the feasibility of a uranium mine.

### How to participate?

- By written submission and/or oral presentation at the hearings.  
\*Individuals who wish to file a submission or make an oral presentation at the hearings are invited to inform the COFEX-South or COMEX Secretariat of their intention prior to the hearings.

**For more information :** [www.ceaa-acee.gc.ca](http://www.ceaa-acee.gc.ca) (JBNQA-Matoush project registry-hearings documents)

### Hot to obtain more information?

On the review : [www.ceaa-acee.gc.ca](http://www.ceaa-acee.gc.ca)  
On the project : Strateco Resources Inc. : [www.stratecoinc.com](http://www.stratecoinc.com)  
Documents are also available to the public at the :  
Mistissini Council  
187, Main St, Mistissini  
Quebec, QC

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### **Webcasting :**

The hearings will be simultaneously broadcasted on line :  
[www.ceaa-acee.gc.ca](http://www.ceaa-acee.gc.ca)



## AGENDA

### Séances d'information publique / Public information sessions Projet d'exploration uranifère Matoush

Mistissini, mardi le 25 mai 2010 / Tuesday, May 25, 2010

Chibougamau, mercredi le 26 mai 2010 / Wednesday, May 26, 2010

14h00	Ouverture de la séance	Chef John Longchap <i>*Seulement pour Mistissini</i>
14h15	-Directives des présidents pour le déroulement de la séance -Courte description du processus d'examen -Présentation des membres des Panels	Benoit Taillon Pierre Mercier
14h30	Présentation du projet et des résultats de l'étude d'impact par Ressources Strateco	Guy Hébert Pierre H. Terreault Jean-Pierre Lachance Caroline Hardy
15h30	Présentation par la Commission canadienne de sûreté nucléaire et Santé Canada	Jean Leclaire Marie-Pierre Grondin Karine Menezes
16h15 -	Période de questions et commentaires du public	
20 minutes avant la fin (au besoin)	Période allouée au promoteur et aux autorités pour des compléments d'information suite aux questions et commentaires du public	
	Fermeture de la séance	Peut se poursuivre en soirée au besoin



2 :00 PM	Opening of the session	Chief John Longchap *(Mistissini)
2 :15 PM	-Procedures for the presentations and question period; -Presentation of the review process -Presentation of all members of the Panels	Benoit Taillon, pres. COFEX Pierre Mercier, pres. COMEX
2 :30 PM	Presentation of the project and the results of the impact study by Strateco Resources Inc.	Guy Hébert Pierre H. Terreault Jean-Pierre Lachance Caroline Hardy
3 :30 PM	Presentation by the Canadian Nuclear Safety Commission and by Health Canada	Jean Leclaire Marie-Pierre Grondin Karine Menezes
4 :15 PM -	Questions and comments period	Could continue during the evening if needed
20 minutes before the end of the session	-Additional information provided by the Panels, experts on discussed topics	
	End of the session	



## **List of participants and organizations who submitted papers or opinions to the Review Panels during the public hearings (phase II)**

### **Mistissini – November 23, 2010**

1. MiningWatch Canada
2. *Canadian Coalition for nuclear responsibility*
3. Réseau québécois des groupes écologiques
4. Mistissini Cree Nation
5. Canadian Parks and Wilderness Society – Quebec
6. Teacher, Mistissini
7. Coalition Mista Cini
8. Cree Trappers' Association
9. Cree Health Board
10. Three young members of the community

### **Chibougamau – November 25, 2010**

1. Conférence régionale des élus de la Baie James
2. Physician, Sept-Îles
3. Association pour la protection de l'environnement des Hautes-Laurentides
4. Sept-Îles sans Uranium
5. Resident of Chibougamau
6. Resident of Chibougamau region
7. Member of the family responsible for trapline M17C
8. Resident Chibougamau



**ADDENDUM TO THE FEDERAL REVIEW PANEL-SOUTH'S  
*RECOMMENDATIONS REPORT*, STRATECO  
RESOURCES INC.'S PROPOSED ADVANCED URANIUM  
EXPLORATION PROJECT, MATOUSH, QUEBEC**

**CANADIAN NUCLEAR SAFETY COMMISSION**

**July 2011**

**CEAR #08-00-46115**



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## 1 BACKGROUND

The following addendum to the draft *Comprehensive Study Report (CSR) for Strateco Resources Inc.'s proposed Advanced Uranium Exploration Project, Matoush, Quebec* was prepared by the CNSC staff. The CSR consists of the Federal Review Panel-South (FRP-S) *Report on Recommendations* [1] and this addendum.

The FRP-S *Report on Recommendations* on the Strateco Resources Inc.'s proposed Advanced Uranium Exploration Project (Matoush Project) recommends the following information be reviewed and concluded upon prior to the Federal Administrator taking an environmental assessment decision in line with chapter 22 of the JBNQA:

- A revised additional baseline data collection program;
- A new version of the ecological risk assessment that takes into consideration realistic scenarios and parameters; and
- An evaluation by the proponent of collaboration with the Cree Nation of Mistissini, on the implementation of information sharing and communication mechanisms.

This addendum presents the conclusions of the CNSC staff's assessment of additional information submitted by Strateco Resources Inc., as recommended FRP-S *Report on Recommendations* [1]. It also contains the results of the CNSC staff's assessment of the proposed alternative effluent discharge location into Stream 4-6. Finally, it includes the path forward for collaborations between the proponent and the community of Mistissini.

## 2 ASSESSMENT OF ADDITIONAL INFORMATION

CNSC staff has assessed the following additional information provided by Strateco Resources Inc.:

- i) A Program for additional baseline collecting data collection, March 31, 2011; [2];
- ii) A revised *Screening Level Human Health and Ecological Risk Assessment for the Matoush Uranium Exploration Project* [3]; and
- iii) *The Assessment of the Potential Environmental Effects of an Alternative Effluent Discharge Location from Lake 5 to Stream 4-6* [4].

The results of this assessment are reported in the following sub-sections.

### 2.1. Program for Additional Baseline Data Collection

It is essential that sufficient baseline data be collected as a basis for comparison to address potential environmental effects. On March 31, 2011, Strateco Resources Inc. submitted to the CNSC a program for the collection of additional baseline data [2]. To develop the program Strateco Resources Inc. reviewed the detailed plans for the project (including a new effluent discharge location), the amount and quality of environmental data that has been collected to date, the proposed Environmental Monitoring Program, and recommendations made by the public, the Province and the CNSC to identify gaps in the amount and type of existing baseline data.

Additional baseline data will be collected for surface water, sediments, benthic invertebrates, aquatic vegetation, fish community and fish tissue chemistry, and terrestrial vegetation (lichen). The proposed baseline data collection program focuses on the aquatic environment as this is the dominant environmental pathway by which ecological and human receptors may be exposed to increased levels of contaminants due to the discharge of effluent from the water treatment plant. The terrestrial transfer of contaminants via air and soil contamination is predicted to be insignificant since releases of contaminants to the air are anticipated to be minor. In order to address public concerns, terrestrial vegetation (lichen) monitoring is proposed, to confirm that releases of contaminants to terrestrial receptors are minor and below levels that would cause significant impacts to terrestrial mammals and humans consuming vegetation.

The baseline data collection program will be aligned with the final Environmental Monitoring Program to ensure that data collected after the project begins can be compared to baseline conditions. Data collection is scheduled for the Spring and Fall of 2011.

CNSC staff reviewed the proposed additional baseline data collection program and found it acceptable.

## **2.2. Human Health and Ecological Risk Assessment**

CNSC staff reviewed the original Environmental Assessment (October 2009) [5] and identified the following deficiencies in the *Screening Level Human Health and Ecological Risk Assessment (SLRA)*:

- Overly conservative source terms in effluent were used;
- The potential contaminants of concern were screened into the risk assessment and using the probable case (15:1 dilution) rather than the upper bound scenario (2.5:1 dilution);
- The spatial extent of potential effects, given the source term, were not well characterized; and
- Specific short-comings and/or lack of clarity existed in modeling the radionuclide risk to fish, wildlife and humans.

CNSC staff has reviewed the revised SLRA submitted by Strateco Resources Inc. [3] in April 2011. In this report, appropriate source terms were used as input to the model and contaminants of concern were included for assessment based on the upper bound scenario for effluent discharge for a release into Lake 5. The potential spatial extent of modified contaminant concentrations in comparison to baseline conditions and further information on the modeling of radionuclide risk to fish, wildlife and humans were provided.

The following sections provide a summary of the results of the revised SLRA and CNSC staff's conclusions.

### 2.2.1. Aquatic Environment

Screening index (SI) values<sup>1</sup> were calculated for various aquatic receptors, including fish, aquatic plants, and benthic invertebrates to assess the potential for adverse effects from exposure to Matoush Project-released contaminants of potential concern (COPC) in surface water resulting from an effluent discharge rate of 100 m<sup>3</sup>/h [6]. No SI threshold exceedances were identified in the revised SLRA from radionuclides or non-radionuclides in surface water, indicating that adverse effects to aquatic biota from a change in the water contaminant levels are not anticipated. The SLRA also compared current and predicted sediment concentrations to sediment toxicity benchmarks [7]. Existing (baseline) concentrations of cadmium and mercury were identified as exceeding the Canadian Council of Minister's of the Environment (CCME) interim sediment quality guidelines (ISQG) [8]. The additional cadmium and mercury in sediment predicted to result from treated effluent is expected to result in a very small increase above the existing baseline concentrations.

CNSC staff is satisfied that discharge of final treated effluent is not likely to cause significant adverse effects on the aquatic environment for the 100 m<sup>3</sup>/h effluent discharge rate.

### 2.2.2. Terrestrial Environment

The revised SLRA [3] of the terrestrial environment evaluated potential risk from exposure to COPC for a subset of local species aimed at encompassing the wide range of dietary habits and potential exposure pathways present at the Matoush site and surrounding area. No SI threshold exceedances were identified from exposure to radionuclides. SI values were also below threshold for all non-radionuclide COPC except for mercury. Mercury exposure resulted in SI threshold exceedances for Osprey, Common Merganser, and American Mink. The primary exposure pathway resulting in these exceedances was the consumption of fish. Exposure to existing (baseline) mercury concentrations in fish resulted in SI exceedances for these three species, with the predicted Matoush Project effluent contributing a minor additional exposure.

Strateco Resources Inc. has committed to collecting additional baseline data, including mercury concentrations in fish tissue. Monitoring of mercury concentrations will also be a component of the proposed environmental monitoring program.

Based on review of the SLRA, CNSC staff are satisfied that radionuclide and non-radionuclide releases from upper bound effluent discharge rate of the 100m<sup>3</sup>/h are also unlikely to cause significant adverse effects to the terrestrial environment.

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<sup>1</sup> A SI value is the ratio of the predicted concentration to a toxicity benchmark value, and indicates whether the predicted concentration in the environment exceeds the level where effects could occur.

### 2.2.3 Human Health Risk Assessment

The original SLRA found in the EIS, identified manganese, nickel and uranium as COPC (in addition to radionuclides). In the revised SLRA<sup>2</sup> [3], no contaminants were identified as COPC in comparing predicted concentrations to applicable soil and drinking water criteria. However, uranium and radionuclides were specifically designated as COPC and assessed in the human health risk assessment as a precautionary measure. Predicted doses from radionuclides resulting from the Matoush Project were well below the radiation dose limit of 1mSv/y.

Even though the inhalation exposure of uranium from baseline conditions exceeded Hazard Quotient (HQ) thresholds for the adult cook and First Nations adult, the predicted exposure is expected to be minimal. The result is presumed to be an overestimation of actual risk. This is because the assessment used a uranium concentration of half the minimum detection level because all measured uranium concentrations were below detection level. This assumption will be verified in future monitoring by collecting samples with lower detection levels. The additional inhalation exposure resulting from the Matoush Project is predicted to be minimal.

CNSC staff is therefore satisfied that discharge of effluent at an effluent discharge rate of 100 m<sup>3</sup>/h is not likely to cause significant adverse effects on human health.

Mercury was not identified as a COPC for the human health risk assessment, but was given consideration in the human health risk assessment due to measured concentrations in baseline fish tissue. The maximum measured concentration in baseline fish tissue was 1.4 mg/kg (mean concentration was 0.64 mg/kg) which is at a level that is subject to fish consumption guidelines by the Province of Quebec. Mercury concentrations were predicted to increase by 0.1 mg/kg to 1.5 mg/kg as a result of the Matoush Project. As mentioned above, Strateco Resources Inc. has committed to collecting additional baseline data including analysis of mercury in fish tissue. Monitoring of mercury concentrations will also be a component of future environmental monitoring associated with the Matoush Project.

### 2.3 Alternative Effluent Discharge Location

The following subsection presents the results of the CNSC assessment of the additional information on the potential effects of the alternative effluent discharge location into Stream 4-6 connecting Lake 4 to Lake 6 [4].

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<sup>2</sup> Revised SLRA was based on a more conservative discharge rate of 100m<sup>3</sup>/h and a more realistic source term was used.

Strateco Resources Inc. provided the following rationale for proposing this effluent discharge alternative, which was suggested by the Québec Ministère du développement durable (MDDEP):

- Fully separate the potable water intake from the effluent release;
- Greater watershed compared to Lake 5;
- Good flow;
- Allow better mixing and dilution of the effluent in the natural environment; and
- Allow better oxygenation which helps biological and chemical activity, thus natural treatment.

The proposed location for the effluent discharge is on the shoreline of Stream 4-6, approximately 75 metres upstream from the mouth of Lake 6. The design of the effluent discharge pipe would remain the same as that which was included in the October 2009 EIS [4], (i.e. effluent will be discharged from two 6" pipes onto a rock apron on the shore prior to entering the stream). Just as for the discharge to Lake 5, membrane and riprap will be added to the shoreline to avoid soil erosion. No physical modification of the stream will be required.

Stream 4-6 is 415 m long, and on average of 7 m wide and 0.5 m deep. Based on informal field observations since 2007, the stream has continuous flow year-around. The stream substrate is mainly composed of boulders and cobbles and preferred spawning habitats for fish have not been observed between proposed effluent discharge point location and Lake 6.

Mitigation measures that will be employed for effluent discharge into Stream 4-6 are the same as those proposed for release into Lake 5. As for discharging into Lake 5, sampling of the final effluent will be completed on a weekly basis and analyzed to ensure that the effluent quality respects both the Quebec's Directive 019 and the Metal Mining Effluent Regulation (MMER) criteria. Administrative and action levels will be set for parameters whose changes are early indicators of a potential loss of control of the effluent treatment process. If any potential problems are foreseen, the discharge of the final effluent can be stopped at any time.

A very conservative assessment of potential risk to aquatic ecological receptors in Stream 4-6 during a low flow scenario identified a very minor exceedance of the uranium toxicity benchmarks. If an exceedance were to occur, it would be for a limited time period and for a limited spatial extent, and therefore is not considered a significant effect.

Both Stream 4-6 and Lake 5 discharge into Lake 6. The potential impact to aquatic receptors using Lake 6 is expected to be less than that predicted for Lake 5 in the revised SLRA, as there is more dilution in Lake 6 (dilution factor of 7) compared with Lake 5 (dilution factor of 2.5) [6].

CNSC staff concludes that the discharge of effluent into Stream 4-6 is unlikely to result in significant adverse environmental impacts to ecological receptors or to human health.

### **3 ABORIGINAL CONSULTATION**

The Federal Administrator, as part of her mandate under the JBNQA environmental and social assessment of the Matoush project, has requested that Strateco Resources Inc. submit an evaluation of the information and communications mechanisms that will be put in place to improve communications between Strateco Resources Inc. and the Community of Mistissini [\[9\]](#).

As part of the CNSC licensing and compliance process, the applicant, Strateco Resources Inc. must submit a public information program that demonstrates how it has and will communicate with interested communities and in particular, the Cree community of Mistissini. The adequacy and effectiveness of this program is the subject of detailed review and verification activities by CNSC staff.

### **4 CONCLUSIONS**

CNSC staff is satisfied that the Matoush Project is not likely to result in significant adverse environmental effects taking into consideration mitigation measures. This conclusion is based on CNSC staff's review of the additional baseline data collection program, the revised ecological risk assessment and the assessment of the alternative effluent discharge location.

CNSC staff will continue to monitor consultation activities and if requested, will be available to meet with the Community of Mistissini.

## 5 REFERENCES

1. *Report on Recommendations, Uranium Exploration Project – Matoush, Quebec*. Federal Review Panel South (COFEX-S), e-DOC 3749514.
2. *Matoush Project, Program for Additional Baseline Data Collection*, March, 2011, e-DOC 3703158.
3. *Revised Screening Level Human Health and Ecological Risk Assessment for the Matoush Uranium Exploration Project (SLRA)* April 2011, e-DOC 3715833.
4. *Assessment of an alternative effluent discharge location – Underground Exploration Project*, July, 2011, e-DOC 3748371.
5. *Environmental Impact Assessment – Underground Exploration Project, Matoush Property*. Strateco Resources, October 2009, Volumes 1-4: e-DOCS 3459009, 3458998, 3459002, 3459004.
6. *Aquatic SIs for Updated Dilution – Effluent Release into Stream 4-6* July 11, 2011, e-DOC 3752617.
7. Thompson, P.A., J.A. Kurias and S.S. Mihok, 2005. *Derivation and Use of Sediment Quality Guidelines for Ecological Risk Assessment of Metals and Radionuclides Released to the Environment from Uranium Mining and Milling Activities in Canada*. . Environmental Monitoring and Assessment 110 (1-3):71-85, e-DOC 3755230.
8. Canadian Council of Ministers of the Environment (CCME), 2008. *Canadian Environmental Quality Guidelines*. Environment Canada, Hull Quebec. Published in 1999, updated in 2008, <http://st-ts.ccme.ca/?chems=all&chapters=1>.
9. Correspondance de l'Administrateur fédéral et Strateco Ressources Inc., June 2011, e-DOC 3746320.