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March 17, 2006

Mr. Jean Trudelle
Director, Permits and Regulatory Affairs
Rabaska
999 De Maisonneuve West, Suite 1600
Montreal, QC H3A 3L4

Subject: Questions and Comments on the Conformity of the Environmental Impact Statement with Regard to the Federal Guidelines
Rabaska Project – Construction of a Liquefied Natural Gas Terminal in Lévis

Dear Sir,

As part of the environmental assessment procedure, we held a public consultation from February 8 to March 13, 2006, on the conformity of the impact statement to the federal guidelines. The following documents were submitted for public review:

- Rabaska, 2006. Construction of a Liquefied Natural Gas Terminal in Lévis – Environmental Impact Statement. January 2006.
 - Volume 1 – Summary
 - Volume 2 – Introduction of the Project and the Proponent
 - Volume 3 – LNG Terminal
 - Volume 4 – Pipeline Connecting the Terminal to Saint-Nicolas

Further to this review, please find attached a document with questions and comments submitted by the federal departments involved in the environmental assessment of the above-mentioned project, as well as those made by the public during the consultation. Please note that this list is neither exhaustive nor final, and it is possible that additional information may eventually be requested.

Should you need additional information, do not hesitate to contact me at (613) 948-1787.

Yours truly,

Original signed by

Dominic Cliche
Panel Manager
Canadian Environmental Assessment Agency

Encl. (1)

- Questions and Comments on the Environmental Impact Statement Submitted by Rabaska

c.c.

Elizabeth Boivin, Health Canada
Louis Breton, Environment Canada
Iannick Lamirande, Natural Resources Canada
Maryse Lemire, Fisheries and Oceans Canada
Jasmine Matin, Canadian Transportation Agency
Pierre Michon, *Ministère du Développement durable, de l'Environnement et des Parcs du Québec*
Marie-Hélène Salvail, Transport Canada
Robert Steedman, National Energy Board

RABASKA PROJECT

**QUESTIONS AND COMMENTS
REGARDING THE ENVIRONMENTAL IMPACT STATEMENT
SUBMITTED BY RABASKA**

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

MARCH 17, 2006

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Questions and Comments from Federal Authorities

CA-001

Reference: Part 3, Volume 1, Section 4.9.3.1

The statement report presents (Part 3, Volume 1, Section 4.9.3.1) the work involved in the excavation of 1,500,000 m³ of material, that would be used, among other things, to install a concealment berm.

Although most of the residences are far from the worksite, the installation of the concealment berm on the south side will be least 400 metres from the nearest residences (those located south of the highway), according to our estimates. We foresee that earthwork operations will create a large quantity of breathable particles produced by the displacement of materials as well as vehicles. In addition, we are surprised by the assessment of the authors of the report: "Given that the work sites are generally far from the nearest residences (located about 500 m south of the highway), the dust generated during construction should not be a nuisance for residents (except for the service corridor)."

Question/Comment:

Have follow-up measures been planned for air quality with respect to sensitive environmental receptors?

CA-002

Reference: Part 3, Volume 1, Section 4.13.1

Table 4.13 indicates the presence of 25 to 180 trucks on the worksite during construction. Diesel-powered equipment is known to produce particularly polluting, fine-particle emissions (PM_{2.5}).

Question/Comment:

Have provisions been made to reduce emissions from diesel vehicles (for instance, monitoring diesel-engine performance, a maintenance and calibration schedule, etc.)?

CA-003

Reference: Part 3, Volume 1, Table 6.2

Contaminant dispersion modelling carried out for the operational phase reveals concentrations of fine particles that are very close to the value established as the criteria for a 24-hour period, that is, 30 µg/m³ (Part 3, Volume 1, Table 6.2). This situation can be attributed to the high background level of fine particles. It was also reported that the modeling of secondary contaminants revealed that the effects would be felt further away from the LNG terminal (Part 3, Volume 1, page 6.11).

Question/Comment:

Could we have the results from the modelling of fine particles and secondary contaminants, given that the concentrations of these contaminants are close to the values established as criteria?

CA-004

Reference: Part 3, Volume 2, Appendix E

The impact assessment grids in information sheets P1 to P7 (Part 3, Volume 2, Appendix E) were not completed.

Question/Comment:

The impact assessment grids in information sheets P1 to P7 should be completed.

CA-005

Reference: Part 3, Volume 1, Section 6.3.12.4

The proponent carried out a detailed noise impact assessment. The method used to assess significant impact on human health is quite similar to the one recommended by Health Canada. Moreover, despite the fact that additional information is required, the method used for the impact assessment was very detailed and satisfactory. However, Health Canada will need the following additional information in order to pursue its analysis.

Question/Comment:

Does the noise impact assessment during construction activities presented in Table 6.17 take into account the +12 dB adjustment recommended by the ISO1996-1 standard for high-impulse noise for determining the percentage of the population that will be greatly affected?

CA-006

Reference: Part 3, Volume 2, Appendix A

The approximate duration of construction noise related to pile driving in terms of sensitive environmental receptors must be clearly indicated. The construction schedule presented in Figure 4.17 suggests that this duration could extend to two (2) years. Generally speaking, the duration of the noise impact due to construction work in terms of sensitive receptors requires more detail. In fact, Health Canada was unable to clearly identify the duration based on the construction schedule presented in Figure 4.17.

Questions/Comments:

- A. Specifications regarding duration, particularly with respect to pile driving, are important since the proponent indicated that from a qualitative perspective there will be a reduction in noise impact given that the construction work is temporary.
- B. However, the work schedule (Figure 4.17) indicates that some of the construction phases could last one to two (2) years. Health Canada considers this duration too long to be considered temporary and to justify a reduction of the noise impact, especially if the receptors are subjected to a high noise impact initially.

CA-007

Reference: Part 3, Volume 1, Section 6

From a qualitative standpoint, the proponent indicated that there will be a reduction in the noise impact during the construction phase due to the fact that the affected area is local. However, Health Canada estimates that a significant local impact may occur and that mitigation measures would therefore be required. Metering points 8 to 11 presented in Table 6.17 are subjected to a strong impact and the proponent shall therefore present adequate mitigation measures. Table

6.34 on mitigation measures indicates that access from Highway 20 may be authorized by the MTQ and that a monitoring program will be put in place.

Question/Comment:

The proponent shall indicate the possible alternatives if this access is not authorized and what mitigation measures will be implemented to mitigate the high impact caused by construction work at metering points 8 to 11 (residential areas).

CA-008

Reference: Part 3, Volume 1, Section 6

Question/Comment:

In terms of assessing baseline noise levels, a brief discussion should be presented in order to be able to establish that the metering points are representative, that is, that these points are not situated too close to roads or too far from residences.

CA-009

Reference: Part 2, Chapter 5, Section 5.2.3

The impact statement indicates that an advisory committee was struck in Beaumont during the initial phases of the project (June 2004) and that the committee received funding from Rabaska in order to conduct independent studies on heritage, the evaluation of property values, safety and economic spin-offs. These studies were made public on November 16, 2004.

Question/Comment:

Can the Proponent provide a copy of these studies for analysis? Despite the fact that these studies were carried out in relation to the first proposed project in Beaumont, much of the information presented must be applicable to the second proposed project in Lévis.

CA-010

Reference: Part 2, Appendix E

Appendix E in Part 2 presents environmental assessments conducted elsewhere in Canada and around the world for projects similar to the one in question here. It is surprising to note that none of the data on the human environment is presented in these tables (public concerns, economic spin-offs, etc.)

Question/Comment:

The proponent should add a human environment component to its tables so that we can see the issues pertaining to this component for these similar projects.

CA-011

Reference: Part 3, Volume 1, Section 2.4.4

It is important to note that the Department of Indian and Northern Affairs stated that there were no land claims by Aboriginal communities on the territory in question. However, it seems that the Band Council of the Viger Maliseet First Nation considers the Rabaska Project to be located on ancestral land.

Question/Comment:

Were there other communications between the proponent and the community on this issue since the impact statement was submitted? If so, aside from the land claims, were any other concerns expressed by Aboriginal people with respect to the project?

CA-012

Reference: Part 3, Volume 2, Appendix A

Figure 2.9 indicates that an equestrian centre is located on the agricultural land that will be purchased by Rabaska.

Question/Comment:

What will happen to the equestrian centre's activities after the land is purchased? This activity is not presented in the recreational and tourism activities described in Section 6.3.6 (Part 3, Volume 1).

CA-013

Reference: Part 2, Section 5.2.6.5

The statement indicates that the proponent will promote, in collaboration with local authorities, the training and hiring of members of the local workforce

Question/Comment:

What concrete measures will be adopted by the proponent to promote the hiring of local workers?

CA-014

Reference: Part 3, Volume 1, Sections 2.2.5 and 4.4.6

There is no evidence that Natural Resources Canada's generic LNG seismic hazard comments (see Appendix 1), provided for other LNG project in Canada, have been considered. However, the review does address some of the points raised by the generic comments, most explicitly by suggesting the use of the European code EN1473, as the proponents consider it more stringent than either of the Canadian or U.S. codes. It seems that there has been no site-specific seismic hazard assessment, and the seismicity and seismic hazard assessment presented in the EIS is more of the nature of a screening-level documentation than the full assessment which is warranted.

Question/Comment:

If there has been an emergency response plan for an earthquake event, please forward the details

CA-015

Reference: Part 2, Table 4.2

Question/Comment:

This correctly identifies the relative seismic hazard levels of the three sites chosen, though the judgment that the Lévis/Beaumont site has "acceptable" conditions is subjective

CA-016

Reference: Part 2, Section 5.3.3.4

Question/Comment:

It is not correct to say that there is no major seismic zone for the pipeline. While buried gas pipelines are indeed ductile and should resist direct earthquake shaking well, there may be ground failure consequences (earthquake-triggered liquefaction or landslides) that may rupture the pipe: have these been considered?

CA-017

Reference: Part 3, Volume 1, Section 2.2.4

Faults are discussed (and in Section 4.4.6.6 it is said that the plant layout will avoid them), but no link to whether or how the faults are linked to potentially-damaging earthquakes.

Question/Comment:

This information needs to be discussed in the site-specific report.

CA-018

Reference: Part 3, Section 4.4.6.6

It appears that the base of the LNG tank foundation will be founded on fractured bedrock, i.e. all sediments will be excavated and no part of the LNG tank foundation will sit on sands, muds or clays. It appears that the bedrock is not very competent (bearing strength 250 KPa; comparable to that for overlying bedrock given in the next paragraph).

Question/Comment:

The shear-wave velocity of this material needs to be assessed in order to convert standard seismic hazard on "firm ground" to the expected motions at the base of the LNG tank foundation. If the shear-wave velocity is not known, it may be acceptable to consider it as "firm ground", but no deamplification of the ground motions (as would be the case on rock) should be claimed.

CA-019

Reference: Part 3, Section 4.4.6.8

Question/Comment:

CNB 2005 values for the site (assumed coordinates 46.820N 71.062W) are slightly higher than given in the EIS (which were taken from the values for Lévis) as there is a gradient away from the nearby Charlevoix seismic zone. The 2005 CNB site values are $S_a(0.2)=0.58$, $S_a(0.5)=0.32$, $S_a(1.0)=0.15$ and $S_a(2.0)=0.052$ g and $PGA=0.35$ g. Although it is not part of CNB2005, PGV calculated using the same model and method is 0.15 m/s. The PGA and PGV values are about twice the values in the 1985/1995 CNB, which is typical for many sites, given the drop in probability level from 1985/95 to 2005.

CA-020

Reference: Part 3, Section 4.4.6.8

CNB values should not be used for critical plant design. This is because values for probabilities higher than 2%/50 years are considered to be reliable only for the construction of standard buildings or similar reliability structures. Values for probabilities lower than 2%/50 years (e.g. 1%/50 year) may be unreliable estimates of the true seismic hazard because they are generated using a nationwide model which must, of practicality, be very general. For example, the position of the seismic zone boundaries used to constrain the positions of the earthquakes generating the hazard might be evaluated in the light of detailed local knowledge, leading to a higher or lower estimate of the hazard.

Question/Comment:

Thus for this LNG plant a site-specific assessment of seismic hazard is required. A specific comment is that while the "H" model is the controlling model for most periods at 2%150 years, the "R" model values are quite similar, and the boundary of the "R" model at Quebec City was very crude and probably set too far to the west (i.e. away from the Rabaska site), so the seismic hazard estimate may be too low.

CA-021

Reference: Part 3, Section 4.4.6.8

"a return period of 10,000 years": Natural Resources Canada will want to check EN1473, but approves the idea of using the more stringent standard.

Question/Comment:

The ground motions will need to be assessed by a site-specific assessment.

CA-022

Reference: Part 3, Section 4.4.6.8

Question/Comment:

The design for the control room should take into account that they are sitting on sediment (not rock, see p. 4.15): their continuing operation may require design to a level higher than CNB.

CA-023

Reference: Part 3, Section 4.17.2

Question/Comment:

The proponent considers that at the present assessment of seismic hazard there appears to be no need for seismic isolation. Note that the 1/10000 year ground motions might be twice (or 1.5 times, or 4 times - to be determined) the 2005CNB values, so that the exact engineering solutions may not yet be evident.

CA-024

Reference: Part 4, Section 2.2.4.4

The figure indicated only pertains to the pipeline.

Question/Comment:

Is the shore near the marine terminal also prone to landslides? Is it possible that this slope might fail under seismic shaking?

CA-025

Reference: Part 1, page 4.65

Question/Comment:

Environmental monitoring during the construction work as well as during operations contains a component on monitoring hydrogeological conditions (water levels and quality of groundwater), but does not specify the number of monitoring wells, sampling frequency and the parameters to be analyzed. It is therefore difficult to judge the quality of the proposed monitoring.

CA-026

Reference: Part 3, page 2.13

Question/Comment:

The 2005 Terratech report is often cited for the section on soils, hydrostratigraphy and hydrogeology but was not available for consultation at the time of the analysis (not included in the appendices). Two Terratech reports are cited in the bibliography: Terratech (2004) and Terratech (2005). The key Figure 2.4 is unfortunately not sufficient to deduce the information required, for instance, stratigraphy, depth to water table and direction of flow.

CA-027

Reference: Part 3, page 2.19

Question/Comment:

Incorrect statement: "...and consequently, the actual direction may differ from that deduced from the hydraulic gradient" [translation]. According to Darcy's Law, hydraulic gradient always determines the direction of flow.

CA-028

Reference: Part 3, page 2.20

Table 2.6: Information about geotechnical drilling (depth, stratigraphy and intercepted levels) required to understand the local piezometry is missing. The proponent stated that there is a local perched water table and a deeper regional water table in the bedrock. The rock aquifer serves as a drinking water supply for residents.

Question/Comment:

From this Table, it is difficult to determine which water table is involved. In both cases, draining/pumping groundwater, found at small depths of 0.5–1.0 m on the site, will be required for the construction of the reservoirs.

CA-029

Reference: Part 3, Volumes 1 and 2

Although not mentioned explicitly in the various reports, the proponent seems to distinguish two types of mass movement: landslides that can affect unconsolidated deposits, and rock falls that can occur along cliffs.

Question/Comment:

For clarity, the typology should be explicitly specified following each mass movement.

CA-030

Reference: Part 3, Volume 2, Appendices A, B and F

The information provided in the different documents indicates that the planned riverside facilities are located at the foot of a 70-m slope (Part 3, Volume 2, Appendix F1, p. 38), with a high-gradient segment for the first 20 m (Part 3, Volume 2, Appendix A, Figure 4.6; Part 3, Volume 2, Appendix B.3, Figure 4.8). This sector is part of the Lévis-St-Nicolas promontory along which several unstable areas of the cliff have been documented in the past.

Question/Comment:

The statement makes no mention of it, and posits the unlikelihood of a mass movement in this sector. The elements presented in this document are not sufficient to justify this assertion.

CA-031

Reference: Part 3, Volume 2, Appendix F1; Part 4, Volume 2, Appendix A

The only stability problems considered pertain to rock falls on the pressurization pump building (Part 3, Volume 2, Appendix F1, Section 5.1.3, p. 38). The map in Figure 4, Appendix A, Part 4, Volume 2, indicates, however, that this sector is not exposed to the risks of “mass movement.”

Question/Comment:

There is a contradiction, and the map must be modified accordingly or the previous analysis reviewed.

CA-032

Reference: Part 3, Volume 1, Section 2.2.4, p. 2.11

Materials that compose the relief in this sector are sandstone or highly fissured shale beds. Mechanically, these materials could behave like soils in the geotechnical sense.

Question/Comment:

While the 15-m high platform at the foot of the slope acts as a stabilizing berm, it would be advisable, if this has not already been done, to evaluate the possibility of a deep rotational landslide occurring on the slope, taking into account the dynamic loading effect during a potential seism.

CA-033

Reference: Part 4, Volume 1, Figures 7.2 to 7.4

The preferred solution is that the pipeline cross the Etchemin, Chaudière and Beaurivage rivers underground, according to the geometry in Figures 7.2 to 7.4, Part 4, Volume 1. The banks of these watercourses may be affected by rotational landslides that have a certain retrogressive impact behind the slopes.

Question/Comment:

It would be useful to include in the above-mentioned figures the potential fracture surfaces in order to show that the pipeline cannot be affected by the fracture.

CA-034

Reference: Part 4

The stratigraphy of the unconsolidated deposits covering the rock present around the river-crossing areas is not specified. However, it is possible that sand levels are interbedded in the marine clay. In case of a seism, these beds can liquefy due to vibrations and temporarily lose all consistency if certain physical and mechanical conditions occur. As a result of gravitational pull caused by the relief along the watercourses, the mass of unconsolidated deposits above the liquefied sand bed can be displaced toward the river, damaging or breaking the gas pipeline depending on the extent of the displacements.

Question/Comment:

Even if the region is not considered to be at high risk of seismicity, it is necessary, in terms of the potential impacts, to determine if this phenomenon could occur (taking into account the potential effects of the site), and to indicate, if applicable, the measures retained to remedy this situation.

CA-035

Reference: Part 4, Volume 2, Appendix A, Figure 4

Question/Comment:

The map indicating the areas exposed to mass movement should be completed by locating, if applicable, the scars from previous landslides that occurred in the crossing sectors (the red lines on the map are not sufficient; the scale of the map must be adapted as needed to clearly visualize the location of the scars).

CA-036

Reference: Part 3, Volume 1, Section 4.4.6.6, page 4.14

The competent rock is covered by approximately 5 m of unconsolidated material along the jetty in the maritime portion. The difference in elevation between the two extremities of the jetty appears to be at least 15 m (Figure 4.6, Appendix A4, Part 3, Volume 2).

Question/Comment:

It would be necessary to present a profile section of the riverbed that follows the jetty and indicate the position of the competent rock. No information is provided on the geotechnical properties of the unconsolidated material. Since there is a slope, subaquatic movement of this unconsolidated material could be initiated during a strong enough seism, particularly if liquefiable sand levels are present. This aspect should be mentioned in the statement.

CA-037

Reference: Part 3, Volume 1, Sections 2.2 and 4.4.6

Question/Comment:

Given the significant geological conditions (bedrock and superficial formations), it is fairly unacceptable that the proponent has not presented an integrated geological vision of the territory targeted by the development project. Consequently, the proponent shall present the relevant geological sections of the superficial formations and bedrock. This would contribute to understanding the nature and distribution of superficial formations below the surface, one of the elements essential to hydrogeological and geotechnical characterization and understanding of the territory targeted by the project. The same comment applies to the bedrock. In both cases, the impact statement simply reformulated existing general information instead of presenting the most relevant geological information with regard to the project.

CA-038

Reference: Part 3, Volume 2, Appendix B-2

River sediment, in the sector of the future jetty and downstream from the jetty, were sampled in fall 2004, that is, 10 above-ground substations and 3 drilling installations (see Figure 2.4, Part 3). The samples were subject to a physicochemical characterization and the results of the analyses are presented in Tables 6, 7, 8 and 9 (Part 3, Volume 2, Appendix B-2).

The levels of the main parameters (metals, PAH and PCB) were compared to the *Interim Criteria for Quality Assessment of St. Lawrence River Sediment*. Chrome and nickel slightly exceeded the

Minimal Effect Level (MEL) in the deep sediment collected at the F2 substation. For the rest of the samples, the levels for the main parameters (metals, PAH and PCB) are below the MEL.

Question/Comment:

Given that the environmental impact statement indicates that the construction and operation of the terminal does not require any dredging work, we find this section to be complete.

CA-039

Reference: Part 3, Volume 1, Section 2.3.2.5

To describe the avifauna in the sector of the terminal (i.e., the jetty and the reservoirs), the author used data from the literature, databases on birds, and the results of inventories carried out on the ground during the nesting season. The inventories were conducted on June 7 and 15, 2005, using the listening points (n = 14). A total of 73 bird species were heard or seen during this field work.

Section 2.3.2.5 of the impact statement provides a relatively complete picture on how the birds use the study area during the nesting season. However, there is little or no information on how the birds use the study area during spring and fall migrations, particularly in the river sector. For example, Table 2.25 provides a qualitative appreciation of the use of the river and gathering sites for aquatic birds (i.e., a list of species), but this information does not provide the reader with a quantitative assessment (when and how many).

Questions/Comments:

- A. Complete the section on avifauna in order to describe (qualitatively and quantitatively) the use of the study area (i.e., the river) by birds during spring and fall migration;
- B. Complete the section on avifauna in order to provide a quantitative description of the use of gathering sites by aquatic birds;
- C. Is the river sector included in the study area used by hunters of migratory birds in the fall? Could the terminal activities (e.g., transshipment) create conflicts with migratory bird hunters during the hunting season?
- D. For a better understanding of the results of the field inventories, the following information is necessary: site identification, dates, start and finish time, duration, observation frequency, weather conditions, wind velocity, species observed, sex, heard or observed, distance, overflight, etc. and, if possible, the gross data (i.e., field datasheets).

CA-040

Reference: Part 3, Volume 1, Section 6.2.2.5

In Section 6.2.2.5, the author assesses the impacts of the project on mammals and birds and enumerates the various measures planned in order to mitigate the effects of the project. With respect to clearing, the proponents propose that clearing be done outside the nesting season, if possible. In our opinion, this measure should be corrected in keeping with the regulations on migratory birds.

Question/Comment:

The proponent shall promise to avoid clearing during the bird nesting season.

CA-041

Reference: Part 3, Volume 1, Table 2.26

The author states that a search in the database of the Centre de données sur le patrimoine

naturel du Québec did not confirm the presence of a species at risk in the study area. However, in Table 2.26, the author presented a list of the wildlife species at risk in the study area.

Question/Comment:

With respect to bird species at risk, we confirm that none of the species listed was confirmed as breeders in the study area. In our opinion, this section is complete and does not require any further investigation.

CA-042

Reference: Part 3, Volume 1, Section 7

SNC-Lavalin used a risk analysis method generally recognized in North America and Europe. The methodology employed by CRAIM (Conseil pour la réduction des accidents industriels majeurs) is identical. Recognized softwares were used to calculate the effects. The two main elements used to estimate accident frequency are accident history as well as security barriers (measures), as recommended by CRAIM.

Question/Comment:

In our opinion, the work presented seems to conform to the methods recognized both in Canada and in Europe. This section is therefore complete.

CA-043

Reference: Part 4

To describe how the right-of-way of the future pipeline will be used by birds, the author used data from the literature, databases on birds and the results of inventories conducted in the field during the nesting season. An inventory was conducted between June 7 and 29, 2005. In all, 63 listening points were visited within the framework of the project, including the layout of the pipeline and the land facilities of the LNG terminal previously mentioned. The listening points were distributed according to large parcels of land (i.e. open areas originally used for agriculture, plantings, regenerating forests, etc.)

These inventories according to listening points were completed by systematically searching the forest environment for nesting structures in trees and signs of birds of prey (cries, attacks, etc.) Moreover, a few spot inventories (specifically for species that are more nocturnal) were carried out during herpetofauna inventories. These inventories were carried out using "playback," in which the observer imitates the call of nocturnal birds of prey to stimulate a response from individuals present in the surrounding area. A total of 116 bird species belonging to 36 different families were observed. Among these species, 103 were considered breeders, with nesting considered to be confirmed for 29 species, probable for 28 species and possible for 46 species.

Question/Comment:

For a better understanding of the results of the field inventories, the following information is necessary: site identification, dates, start and finish time, duration, observation frequency, weather conditions, wind velocity, species observed, sex, heard or observed, distance, overflight, etc. and, if possible, the gross data (i.e., field datasheets).

CA-044

Reference: Part 4, Section 7.3.5.3

In Section 7.3.5.3, the author assesses the impacts of the project on avifauna and enumerates the various measures planned in order to mitigate the effects of the project. With respect to

clearing, the proponents propose that clearing be done outside the nesting season, if possible. In our opinion, this measure should be corrected in keeping with the regulations on migratory birds.

Questions/Comments:

- A. The proponent shall promise to avoid clearing during the bird nesting season.
- B. The proponent shall pursue its field investigation over more than one season in order to confirm the northern goshawk's nesting in the right-of-way of the future pipeline.

CA-045

Reference: Part 4, Table 2.9

In Table 2.9, the author presents a list of bird species at risk observed in the study area since 1988. The author also confirms that several species listed in Table 2.9 nest or have nested in the study area, but that no nesting sites will be located in the right-of-way of the future pipeline (see Figure 8, Appendix A, Part 4, Volume 2).

Question/Comment:

In our opinion, the information on bird species at risk is complete, and does not require any further investigation.

CA-046

Reference: Part 4, Volume 1, Section 5

Section 5 does not address the crossings of the Canadian National railroad at Mile (substations) 12+480 and 14+239 (as per the plans). We can assume that the proponent plans to install the pipeline using directional drilling under the railway right-of-way, but these crossings were not mentioned.

Question/Comment:

The proponent shall specify its plans with regard to the crossings of the railway rights-of-way.

CA-047

Reference: Part 3, Volume 1, Section 6

In our opinion, the impacts on navigational safety described in Chapter 6 (recreational and tourism activities, commercial fishing and maritime transportation) are insufficient. The proponent indicates that the only mitigation measures in place during the construction of the jetty and operation of the terminal are notices to shipping issued by the Canadian Coast Guard.

Question/Comment:

In our opinion, other mitigation measures are necessary to ensure navigational safety. Here are some examples:

- Ensure that a procedure for issuing advance notices to shipping is in place;
- Determine the navigational aids required during construction and operation based specifically on work methods, maritime equipment and work schedule;
- Mark a security perimeter using yellow warning buoys, if necessary;
- Avoid obstructing the efficiency of the navigational aids;
- Ensure that no equipment, material or debris from the work is left in the watercourse;
- Keep infrastructures lit during the work.

CA-048

Reference: Part 2, Section 3.1

Question/Comment:

Transport Canada provides below an incomplete summary of information required to issue a permit under the *Navigable Waters Protection Act* (NWPA). This information could also be relevant in the context of the current environmental assessment.

- A. General information regarding all maritime infrastructures of the LNG terminal:
- The plans must provide plan views and profile views, indicating the overall dimensions of the said infrastructures.
 - If possible, the plans should be on 11" x 17" paper or larger.
 - A plan view on the georeferenced marine map (NAD83) no. 1317, including all of the terminal infrastructures in the watercourse and on the shoreline at the scale of the map.
 - Indicate the geographic coordinates (NAD83) of extreme structures as well as the exact position of the planned terminal.
 - Profile plans must indicate the higher high water, large tide (HHWLT) as well as the line indicating the chart datum (CD) level for the infrastructures in the water. The minimum vertical clearance beneath the structures in terms of the HHWLT level must also be indicated.
 - A description and representation of the terminal and jetty's main lighting system as well as the fixed navigational aids that will be set up. The location, type of lighting, intensity, orientation, angles of coverage, colour and lighting periods: day/night, annual/ seasonal.
 - The main colour of the structures in the water.
 - On the dolphins of the terminal's East and West extremities, a two-(2-)meter high yellow band must be painted along the entire circumference of these structures and indicated on the plans.
 - The location and main dimensions of the emergency and rescue equipment, including a fire station, life buoys, ladders, etc.
- B. Specific information regarding navigational aids:
- The features and methodology for determining navigational aids that will be proposed such as lights and daymarks must conform to the standards of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the Canadian Coast Guard (location, height, elevation, distance between structures based on the sensitivity of the aids). Moreover, it is important that the colour and features of the navigational aids proposed for the terminal be different from the lights on the surrounding shoreline as well as the other navigational aids (floating or fixed) that could be confused with those of the terminal.
- C. On the plan and profiles, drawings must indicate:
- The features and calculation data of the sensitivity of the aids proposed such as: lights, daymarks, radar reflectors, etc. Indicate the type, model, colour, scope, etc.;
 - Dimensions and geographic coordinates (NAD83) of all of the aids, as well as their periods of operation (annual or seasonal, night or 24 hour);
 - The elevation of fixed structures as well as navigational aids in reference to the higher high water, large tide (HHWLT);
 - If the proponent proposes to install private floating aids (buoys), it must provide all of the related features, including the anchoring system. In addition, the proponent shall indicate on the drawing that these "Buoys will comply with the *Private Buoy Regulations* (SOR/99-335) under the *Canada Shipping Act*";
 - If necessary, the proponent shall also produce separate drawings for all of the temporary navigational aids planned during the construction period.

D. Additional information:

- During construction of the jetty, the proponent shall take all steps to inform navigators of the presence of equipment required to carry out the work in the watercourse. The type of equipment, operating hours, work period, contact persons must be included in NOTSHIPS coordinated with the Canadian Coast Guard's Vessel Traffic Service (Québec City Centre).
- The maritime equipment planned for carrying out the work in the watercourse as well as the personnel working aboard the equipment must comply with the provisions under the *Canada Shipping Act* and its related regulations.

CA-049

Reference: Part 3, Volume 1, Section 2.1

As stated on page 2.2, since the speed of the LNG tankers will be less than the maximum speed permitted in the Saguenay St. Lawrence Marine Park, that the additional traffic generated by the project represents only 2.5% of the current traffic and that LNG is not harmful to halieutic resources, the study area in the riparian environment was limited to the immediate area surrounding the wharf and the jetty in order to circumscribe the expected repercussions on the halieutic resources resulting from the implementation and operation of the maritime facilities.

Question/Comment:

Considering that few ships the size of the LNG tankers currently use the seaway and that the LNG tankers will pass close to the areas used by special-status species (e.g., blue whales, belugas from the St. Lawrence estuary, Atlantic sturgeon, rainbow smelt, etc.), the study area must include the St. Lawrence estuary, specifically from Pointe-des-Monts (eastern limit of the estuary) to the Rabaska terminal, for assessing the impacts of LNG tankers on fish and marine mammals (collisions, disturbance caused by tanker activity and noise).

CA-050

Reference: Part 3, Volume 1, Section 2.3.2

As mentioned in Question/Comment 49, the study area must include the St. Lawrence estuary for assessing the impacts of LNG tanker navigation on fish and marine mammals.

Questions/Comments:

The proponent shall therefore:

- A. Use maps to identify the habitat and staging area of marine mammals (for more information, see References) as well as the habitats of interest for fish (e.g., concentration of juvenile Atlantic sturgeon) located close to the LNG tanker route in the St. Lawrence estuary.
- B. For marine mammals, special attention must be given to the blue whale and beluga from the St. Lawrence estuary which are protected under the federal *Species at Risk Act* (SARA). For more information, visit <http://www.sararegistry.gc.ca/>.

CA-051

Reference: Part, Volume 1, Section 2.3.2.2

On page 2.69, it is indicated that rainbow smelt have already been harvested during the spawning season at the mouth of Saint-Claude Creek, but that very few eggs were found during searches by the MRNFQ.

Question/Comment:

Explain why the reproduction potential of the rainbow smelt in this creek is considered limited, based on the habitat features at the mouth of Saint-Claude Creek (width, depth, type of flow, substrate, flow velocity, obstacle to migration, water quality, etc.).

CA-052

Reference: Part 3, Volume 1, Section 2.4.11

This section deals with airborne noise levels in the study area prior to any modification related to the Rabaska LNG terminal project. Under federal guidelines, an analysis of the impacts on the sound environment was requested, along the boundaries of the sites and at sensitive points, including underwater noise levels in the maritime terminal sector.

Question/Comment:

In order to comply with federal guidelines, the proponent shall present the current underwater noise levels in the maritime terminal sector.

CA-053

Reference: Part 3, Volumes 1-2, Section 4.5

This section indicates that from the Escoumins, ships continue on to Lévis along the north shore of the river and along the northern Traverse and the Grands Voiliers channel. More specifically, the following statement appears on page 34, Appendix F-2 (Part 3, Volume 2): "Upstream from the Escoumins, ships that do not go up the Saguenay continue along the St. Lawrence, north or south of Île Rouge. The ships that opt for the northern channel base their decision on prevailing conditions" [translation].

Question/Comment:

Can LNG tankers pass south of Île Rouge? If so, in what conditions and at what frequency?

CA-054

Reference: Part 3, Volume 2, Appendix F-2

On page 39, Appendix F-2 (Part 3, Volume 2), it is stated that there is no official speed limit between Cabot Straight and Québec City and that the pilot must determine the speed limit where necessary.

Question/Comment:

Specify, where possible, the speed of the LNG tankers in the different sections of the seaway, from Pointe-des-Monts to the Rabaska terminal.

CA-055

Reference: Part 3, Volume 1, Section 4.5.2

On page 2.40, it is stated that: "The yearly 120 crossings, roundtrip, of the LNG tankers do not significantly increase river traffic which is currently at approximately 5000 roundtrips for merchant ships" [translation].

Questions/Comments:

- A. What will be the Dead Weight Tons (DWT) of the LNG tankers?
- B. Compare the increase in maritime traffic that will be caused by the Rabaska project with the ships in the same DWT category currently navigating the St. Lawrence estuary.

CA-056

Reference: Part 3, Volume 1, Section 4.5.3

On page 4.20, it is stated that the holding areas for a few hours have been established in the TERMPOL process.

Questions/Comments:

- A. Specify where these holding areas will be located.
- B. Indicate the difference between a holding area and a mooring area.

CA-057

Reference: Part 3, Volume 1, Section 4.7.1.3

Riverside facilities will be built on a rockfill platform with a 1.25 ha right-of-way (inside dimensions of approximately 50 m in width by approximately 80 m in length). Given that the impact of the presence of riverside facilities on rainbow smelt is considered to be of moderate importance (see p. 6.53) and that the Policy for the Management of Fish Habitat (DFO, 1986) encourages alternatives and modifications to the proposed project (work methods, location of work sites, schedules, etc.) in order to avoid or reduce the negative effects on fish habitat, the proponent shall:

Question/Comment:

Document the need for such an encroachment area in the aquatic environment.

CA-058

Reference: Part 3, Volume 1, Section 4.9.1

Figure 4.17 presents the project schedule for the terminal. According to this figure, the construction of the jetty infrastructures will commence at the beginning of 2007 and will be completed at the end of 2008; the preparation of the site for the land infrastructures will begin in early 2007 and will take 5 months to complete.

Questions/Comments:

- A. In order to adequately assess the impacts of the project on fish, the proponent shall provide, to the best of its knowledge, a more detailed schedule of the work in the aquatic environment (filling, drilling and pile driving, blasting, diversion of the Saint-Claude Creek, watercourse crossings, etc.). The schedule must indicate the total duration of each activity and the months during which the work will be carried out as well as the frequency of each activity (number of hours a day, number of days a week) for blasting, drilling and pile driving).
- B. In order to set acceptable dates for carrying out the work in the aquatic environment, the proponent shall provide a biological calendar indicating, for the main fish species found in the sector of the terminal, the major periods of their life cycle (reproduction, rearing, migration).

CA-059

Reference: Part 3, Volume 1, Section 4.10.2

The LNG reservoirs will undergo hydrostatic imperviousness tests. These tests require approximately 110,000 m³ of water that will be taken from the St. Lawrence River by a temporary water intake and transferred from one reservoir to the other. This water will be analyzed before being released into the river.

Questions/Comments:

- A. Specify the location of the temporary water intake and the water release point used during the hydrostatic tests and describe these infrastructures as well as the conditions for water sampling and release.
- B. Ensure that the intake of the pumping hose is equipped with an appropriate device to avoid entraining or injuring fish (see the Freshwater Intake End-of-Pipe Fish Screen Guideline http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/index_e.asp).
- C. Specify the encroachment area in the aquatic environment of the support and protection structures, if applicable, and discuss the impact of these encroachments on fish species and their habitat.
- D. Indicate how and when these temporary structures will be dismantled.

CA-060

Reference: Part 3, Volume 1, Section 6.2.2.1

In this section, it is indicated that 1.1 ha of the intertidal and subtidal zone will be lost due to construction of the jetty and that the impact will partially be mitigated by the presence of piles that will offer a vertical substrate to some benthic organisms that will gradually colonize these supports (approximately 3300 m²). The proponent shall:

Question/Comment:

Specify which species could benefit from this vertical substrate and in terms of which biological functions.

CA-061

Reference: Part 3, Volume 1, Section 6.2.2.2

On page 6.47, it is indicated that during the construction phase, the fill work for the riverside facilities and the pile driving could disturb the ichthyofauna present in the study area due to the resuspension of sediments. The proponent shall:

Question/Comment:

Describe the potential impact of the resuspension of sediments caused by setting up fill material for the riverside facilities and pile driving with regard to the movement of fish likely to frequent this sector. Special attention must be paid to disturbance of the migration of American shad, Atlantic sturgeon and American eel.

CA-062

Reference: Part 3, Volume 1, Section 6.2.2.2

To limit disturbances to the ichthyofauna during the work in water, mitigation measures have been proposed such as the construction of low-tide rockfill foundations for the platform. Since this measure will not be completely effective in limiting the resuspension of sediment (subtidal zone, neap tides), the proponent shall:

Question/Comment:

Document the implementation of additional mitigation measures to reduce the expected impacts caused by the resuspension of sediments (e.g., application of a restriction period during sensitive periods for fish such as spawning, rearing, migration, carrying out work during the day only to avoid disturbing species that reproduce or migrate at night, carrying out fill work beginning at the perimeter, etc.).

CA-063

Reference: Part 3, Volume 1, Section 6.2.2.2

Opening an access road to the jetty sector may require the use of explosives to fragment the bedrock of the cliff. The proponent shall:

Questions/Comments:

- A. Specify the distances of the blasting sites in relation to the river environment.
- B. Show how the blasting work will respect *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky, 1998).

CA-064

Reference: Part 3, Volume 1, Section 6.2.2.2

On page 6.47, it is indicated that the noise generated by the work could temporarily displace the ichthyofauna to the periphery of the worksite. The noise produced during the maritime construction work could cause other negative effects on the fish (e.g., disturbance during feeding and movement, ruptured swim bladder, etc.). In order to comply with the federal directives, (see Question /Comment 52), the proponent shall:

Questions/Comments:

- A. Indicate the underwater noise level for each of the construction activities of the maritime infrastructures (drilling, pile driving, use of barges, etc.) and blasting.
- B. Using modelling, indicate the expected underwater noise levels within the boundaries of the study area during the construction work for the maritime infrastructures and blasting.
- C. Describe the potential impacts of increasing the underwater noise level for each of the construction activities on fish, taking into account the intensity and the duration of these activities. Special attention must be paid to the larva of rainbow smelt and American shad that are present in abundance in the study area as well as disturbance to the migration of American shad, Atlantic sturgeon and American eel.
- D. Document the implementation of mitigation measures to avoid or reduce these impacts (e.g., avoid work during critical periods for fish, such as spawning, rearing, migration, carrying out work during the day only to avoid disturbing species that reproduce or migrate at night, use of a bubble curtain, etc.).

CA-065

Reference: Part 3, Volume 1, Section 6.2.2.2

At the bottom of page 6.47, it is indicated that the construction work will cause virtually no temporary loss of habitat. This statement suggests that there will in fact be some temporary loss of habitat.

Question/Comment:

What is this temporary loss of habitat?

CA-066

Reference: Part 3, Volume 1, Section 6.2.2.2

In the sub-section that deals with the operational phase (Phase d'exploitation), it is indicated that the additional traffic generated by the Rabaska project represents less than 2.5% of the current traffic and will have no significant effect on the ichthyofauna. Moreover, it is indicated that since the speed of the LNG tankers (approximately 18 knots) will be below the authorized maximum speed (25 knots) in the Saguenay St. Lawrence Marine Park, the increased traffic caused by the Rabaska project should not have any perceptible impact on the marine park.

Considering that few ships the size of LNG tankers use the seaway and that the LNG tankers will pass close to the areas used by special-status species (blue whale, belugas from the St. Lawrence Estuary, American sturgeon, rainbow smelt, etc.), the proponent shall assess the impacts of the LNG tanker navigation on fish and marine mammals (collision, disturbance by cause by crossings and noise) in the St. Lawrence estuary.

Questions/Comments:

- A. Present underwater noise levels of LNG tankers navigating at different speeds. For comparison, the proponent shall provide data on noise levels produced by other types of ships that use the St. Lawrence seaway.
- B. Discuss the increased noise level caused by the LNG tankers, in terms of the different navigational speeds, on the fish and marine mammals when they pass close to the sensitive areas identified in Question/Comment 50.

- C. In order to reduce underwater noise emissions by the LNG tankers, the proponent shall document implementation of mitigation measures (e.g., use of propellers designed to reduce cavitation).
- D. Discuss the increased risk of collision of LNG tankers with marine mammals in terms of the different travelling speeds of the LNG tankers and the different sectors where the tankers travel (e.g., proximity to an area of intensive use by belugas, route south of Ile Rouge versus route north of Ile Rouge, etc.). Document implementation of mitigation measures to reduce these impacts.
- E. Since the LNG tankers will cross the St. Lawrence Estuary Marine Protection Area (MPA) which is in the process of being created, the proponent shall put into perspective the measures it plans to take to fulfil the objectives of this MPA, particularly with regard to the increase noise and risk of collision when the terminal is in operation (see <http://www.gc.dfo-mpo.gc.ca/zpmestuaire/>).

CA-067

Reference: Part 3, Volume 1, Section 6.2.2.2

In Section 4.15.1 regarding noise during operations, it is indicated that some of the terminal components are sources of noise that could affect the surrounding sound environment. In terms of the jetty, the sources of noise that were identified are the pressurization pumps, transformers, docked LNG tankers and towing vessels.

Questions/Comments:

- A. Indicate the underwater noise level for each of these sources of noise.
- B. Using modelling, the proponent shall indicate the underwater noise levels expected within the boundaries of the study area for each of these sources of noise when the terminal is in operation.
- C. Describe the potential impacts of increased underwater noise levels on fish in the terminal sector.

CA-068

Reference: Part 3, Volume 1, Section 6.2.2.2

On page 6.49, it is indicated that adding permanent structures on the riverbed will lead to the loss of close to 1.1. ha of fish habitat. The proponent stresses that the habitat loss will be compensated in its entirety in compliance with the hierarchy of compensation described in the DFO's Policy for the Management of Fish Habitat.

If it is shown that it is possible to completely avoid any loss in fish habitat and that these losses are deemed acceptable, the DFO could issue an authorization to modify the fish habitat under subsection 35(2) of the *Fisheries Act* which permits the deterioration, destruction and disturbance of fish habitat through means or under circumstances approved by the DFO.

Subject to additional information requested in this document, compensation needs could then be specified. While it is not necessary to know all of the details of the compensation program for the purpose of the environmental assessment, the specifics of the compensation project must be provided before the DFO authorizes any modification of fish habitat. In this respect, the proponent is encouraged to submit to the DFO, as soon as possible, the concept of the habitat compensation program in view of compensating for habitat loss caused by the project. The compensation proposal must include the following information:

- Description of the nature of the compensation work;
- Location (latitude and longitude, lot number, etc.) of each site to be set up as well as its area and property rights;
- Presentation and description of the objective(s) of the compensation project;
- Estimation of the time needed to attain the targeted objective(s);
- Description of the interventions, planned methods and work schedule;
- Description of the biological, hydrological, physical and chemical characteristics of the targeted sites before and after development. Ideally, the description of the initial environment should include photographs taken on the ground and dates. It should be possible to identify the reference points on the photographs.
- Description of the functions of the fish habitat that will be created (reproduction, rearing and feeding grounds, etc.).
- Presentation of a monitoring program in order to ensure that the targeted objectives have been reached, if applicable, and the adjustments to be made.

CA-069

Reference: Part 3, Volume 1, Section 6.2.2.2

During the operating phase, the water generated by the atomizers will be released into the river near the berth, via a pipe installed in the service corridor. According to the impact statement, the river flow will help to reduce the impact of the effluent on the fish habitat since the criterion for chronic toxicity will be respected and the effect on the temperature of the river will be negligible.

Since the temperature of the water outfall should be an average of 30°C, the water temperature could be affected locally, particularly in the winter.

Question/Comment:

Discuss the local thermal impacts of this release on the aquatic environment in terms of the anticipated dispersion plume and discuss the use of devices to increase the release and reduce the temperature of this water before it enters the river.

CA-070

Reference: Part 3, Volume 1, Section 6.2.2.2

On page 6.50, it is stated that in case of an LNG spill while the tanker is navigating Canadian waters, the LNG will vaporize without mixing into the water and is therefore not harmful to halieutic resources.

Question/Comment:

Given the very low temperature of LNG (-160°C), discuss the potential impacts of a drop in water temperature at the surface caused by an LNG spill in terms of the fish and marine mammals that may be nearby.

CA-071

Reference: Part 3, Volume 1, Section 6.2.2.2

On page 100 of Appendix F-2 (Part 3, Volume 2), it is stated that a phenomenon known as rapid phase transition (RPT), that is, an extremely rapid transition of physical phase which transforms the liquid LNG into vapour, mainly due to the fact that it is submerged in water. It is indicated that this transition can cause small but violent localized explosions which can only cause weak pressurization at greater distance.

Question/Comment:

In case of an LNG spill in the St. Lawrence Estuary, discuss the impact of an RPT on the fish and marine mammals that may be found nearby.

CA-072

Reference: Part 3, Volume 1, Section 6.2.2.3

On page 6.51, it is indicated that an increase in the turbidity of the water during the work in water will particularly affect the larva of rainbow smelt given their high concentration in the study area during the summer period. Consequently, the proponent indicated that the concentration of suspended particle matter close to the work area will be the focus of regular monitoring from June to August (concentration period for the larva of smelt and American shad). If the concentration exceeds by 25 mg/l that of the surrounding environment, 200 m in the sediment dispersion plume, measures will be taken to re-establish an acceptable water quality. The proponent shall:

Questions/Comments:

- A. Provide more details regarding the sampling protocol described on page 8.12, Chapter 8 (number of samples, location of samples, etc.).
- B. List the measures that will be taken to re-establish an acceptable water quality.

CA-073

Reference: Part 3, Volume 1, Section 6.2.2.4

The crossing of the new segment of Saint-Claude Creek will be set up before the creek is diverted. Consequently, no impact on the fish habitat is expected during the construction phase. However, once the creek has been diverted to its new segment, the crossing should ensure the free passage of fish. In the context of the environmental assessment, the proponent shall agree to ensure the free passage of fish for this crossing.

Furthermore, to obtain authorization to destroy, deteriorate or disturb fish habitat under subsection 35(2) of the *Fisheries Act*, the proponent shall:

Questions/Comments:

- A. Specify the type of structure chosen for the Saint-Claude Creek crossing (bridge, culvert, footbridge, etc.) as well as its characteristics.
- B. Show how the free passage of fish will be ensured at the Saint-Claude Creek crossing.

CA-074

Reference: Part 3, Volume 1, Section 6.2.2.4

Land work includes a few water crossings, including two creeks, in order to build the service road and cryogenic lines. Within the framework of the environmental assessment, the proponent shall agree to allow the free passage of fish for these two crossings. In addition, in order to determine the potential impacts on fish habitat, the proponent shall:

Questions/Comments:

- A. Specify the type of structure chosen for the passage of the service road (bridge, culvert, footbridge, etc.), its characteristics, work methods and duration of this work.
- B. Characterize the fish habitat at the site of the crossing of watercourse R03 (see Appendix C-2, Volume 2), that is, the second watercourse that will be crossed under the service road and cryogenic lines starting at the jetty.

Moreover, to obtain authorization to destroy, deteriorate or disturb fish habitat under subsection 35(2) of the *Fisheries Act*, the proponent shall:

- C. Show how the free passage of fish will be ensured at these crossings.

CA-075

Reference: Part 3, Volume 1, Section 6.2.2.4

Section 4.9.2, regarding temporary facilities, presents a proposal to build a temporary access from Highway 20 in order to limit the impact of the work on local and surrounding traffic during construction. In Figure 6.7 in Appendix A (Part 3, Volume 2), we see that this temporary access will cross the new segment of Saint-Claude Creek. If this access is built, the proponent shall:

Questions/Comments:

- A. Describe the type of structure chosen for this crossing, the work methods that will be employed and the work schedule (including dismantling).
- B. Discuss the impact of the construction and dismantling of this temporary access on fish species and their habitat.
- C. Document the implementation of mitigation measures to avoid or reduce these impacts.

CA-076

Reference: Part 3, Volume 1, Section 6.2.2.4

Development of the terminal facilities will require a permanent deviation of a segment of approximately 955 m (1620 m²) of the western branch of the Saint-Claude Creek. This segment will be filled to enable the construction of the terminal facilities. In order to compensate for these fish habitat losses, the proponent proposes the creation of a new watercourse so that there is no net loss of fish habitat. In order to determine the potential impact on fish habitat, the proponent shall:

Questions/Comments:

- A. Provide more details about the interventions, planned methods and work schedule for the diversion of Saint-Claude Creek.

- B. Document the implementation of mitigation measures to avoid the resuspension of sediments during the filling of the new segment.

The additional information below will be necessary to obtain authorization to destroy, deteriorate or disturb fish habitat under subsection 35(2) of the *Fisheries Act*:

- C. Indicate if there are plans to install a substrate on the riverbed of the new segment. If so, what type of substrate is planned?
- D. Explain why there are no plans to stabilize the banks with trees or shrubs in the agricultural section.
- E. Present a follow-up program to monitor the success of the installations (e.g., success of revegetation, stability of developments).

CA-077

Reference: Part 4, Volume 1, Section 4.3.1.4

The layout presented in the impact statement anticipates affecting an area of approximately 0.09 km² of wetlands. In Section 2.2.6.1, it is indicated that several small streams that feed the main watercourses originate in various sectors characterized by a wetland. Therefore a wetland can also be a fish habitat if the wetland has an accessible hydric link with a watercourse identified as a fish habitat.

Question/Comment:

In light of the information provided above, identify the wetlands considered as fish habitats and evaluate the expected impacts of the project on these habitats.

CA-078

Reference: Part 4, Volume 1, Section 4.3.1.5

The gas pipeline will be installed within the boundaries of the permanent 23-metre wide right-of-way. During the operational phase, vegetation monitoring must be carried out on this right-of-way. Ideally, a protective strip (natural vegetation area) should be maintained on either side of the fish habitat.

Question/Comment:

Discuss the possibility of restoring vegetation on the buffer strip (MHWL + 20 m) without any monitoring (or minimal) of the vegetation.

CA-079

Reference: Part 4, Volume 1, Section 5.1

The impact statement indicates that some facilities built during the work for the first project (Rabaska or the St. Lawrence pipeline) are still standing so that they can be used by the work teams of the second project, in an effort to minimize the impact on the environment. The plan, therefore, is to preserve the access road that will be built by the teams from the first project, including the culverts that will be installed in ditch and watercourse crossings.

Questions/Comments:

- A. Discuss the possibility of carrying out both projects at the same time and estimate the period of time that could separate the implementation of both projects.
- B. Specify which proponent will be responsible for dismantling the infrastructures, site restoration and subsequent monitoring, if applicable.

CA-080

Reference: Part 4, Volume 1, Section 5.2

The impact statement indicates that the operation of the network will require the installation of above-ground structures such as a delivery gate, pigging stations and automatic block valves.

Question/Comment:

Locate on a map all of the above-ground structures that are necessary to operate the network and justify their presence less than 10 metres from the MHWL, if applicable.

CA-081

Reference: Part 4, Volume 1, Section 5.4

Table 5.3 contains a description of each of the construction activities, presented in chronological order of completion of each activity.

Questions/Comments:

- A. Can the proponent preserve the vegetation along the shoreline (MHWL + 20 m) right up to the very beginning of the trench excavation work?
- B. Address the construction of the access road in Table 5.3.
- C. Estimate the duration of the execution of each activity presented in Table 5.3.
- D. Describe how the worksite will function and the order to the work.

CA-082

Reference: Part 4, Volume 1, Section 5.5

Hydrostatic tests will be carried out to verify the integrity of the pipe. The impact statement indicates that the water used for these tests could be pumped from the rivers but that it must first be filtered before filling the pipe.

Questions/Comments:

- A. Describe the infrastructures necessary for water supply (intake and outfall), as well as the conditions for water sampling and release in relation to the river flow.
- B. Discuss the impacts on fish and their habitat.
- C. Be sure to equip the end of the pumping system's suction pipe with a suitable device to prevent the entrainment or injury of fish (see the Freshwater Intake End-of-Pipe Fish Screen Guideline http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/index_e.asp).

CA-083

Reference: Part 4, Volume 1, Section 7.2

The impact statement indicates that the access roads will be built within the boundaries of the permanent right-of-way. A construction method for the access roads is described in Section 7.3.3.1 on directional drilling.

Questions/Comments:

- A. Will the technique described in Section 7.3.3.1 be used for all of the access roads?
- B. Detail the construction method for access roads in the area of the watercourses.

CA-084

Reference: Part 4, Volume 1, Section 7.3.2.5

At each crossing, the work can proceed uninterrupted within a 6- to 15-hour period. For instances in which the work must extend over more than one day, the diversion canal method is considered less harmful to fish. In fact, the diversion canal, in addition to maintaining the free passage of fish, ensures continuous water flow thereby avoiding dewatering downstream in the event of a pump breakdown, blocked pipe, etc.

Question/Comment:

Document and analyze the crossing method with a diversion canal and present this construction method for the watercourses in information sheets 3, 4, 6, 15, 19, 22, 23, 24, 26, 31 and 33.

CA-085

Reference: Part 4, Volume 1, Section 7.3.2.5

The proponent favours the use of a pipe as the dry crossing method for watercourses where it is necessary to maintain a passage for fish migration.

Question/Comment:

Describe the structure and demonstrate how the conditions ensuring the free passage of fish will be respected (see Question/Comment 96).

CA-086

Reference: Part 4, Volume 1, Section 7.3.2.5

A minor excavation upstream from the work area should be carried out to permit adequate pumping of water from the watercourses.

Questions/Comments:

- A. Detail and carefully justify the need for this excavation, estimate the area of habitat that will be affected and describe site restoration.
- B. Be sure to equip the end of the pumping system's suction pipe with a suitable device to prevent the entrainment or injury of fish (see the Freshwater Intake End-of-Pipe Fish Screen

Guideline http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/index_e.asp).

During pumping, the end of the hose directing the water downstream could be placed in the culvert (Scenario A) or in the direction of an energy dissipation element (Scenario B).

- C. Present the advantages and disadvantages of Scenario A compared to Scenario B in terms of the impacts on fish habitat.
- D. Identify the criteria that will be used to select the scenario and specify if a priority will be assigned.

CA-087

Reference: Part 4, Volume 1, Section 7.3.2.5

It is indicated in Table 7.5 that the anticipated construction method for 10 watercourses is “dry intermittent stream.” In the summary information sheets in Volume 4, these 10 watercourses are assessed with a description of the construction method. Yet, Section 7.3.2.4 indicates that only 7 watercourses are intermittent.

Questions/Comments:

- A. Does the proponent plan to use an “dry intermittent stream” construction method for intermittent watercourses only?

Intermittent watercourses are not necessarily dry every summer.

- B. Present an alternative construction method for watercourses that will not be dry at the time of the work.

CA-088

Reference: Part 4, Volume 1, Section 7.3.2.5

A watercourse crossing in water involves excavation work in open water. This entails high risks to fish habitat, including the resuspension of sediments. Consequently, the DFO’s position is that this method is harmful to fish habitat.

Question/Comment:

Can the proponent indicate if this method can be withdrawn from the possible choices for digging trenches in the watercourses?

CA-089

Reference: Part 4, Volume 1, Section 7.3.2.6

The impacts of the project on fish habitat must be determined in terms of area affected for different fish habitat functions (feeding, nursery, etc.), as well as in terms of the duration of temporary impacts.

Questions/Comments:

- A. Present the interventions likely to affect the aquatic and riparian environment. The various project stages (including their duration) and anticipated work methods must be described with the greatest precision possible (e.g., machinery, excavation, backfilling, temporary access road, cofferdam, bank stabilization).

- B. Where possible, estimate the fish habitat areas (below the mean high water level and in the flood plains) that will be destroyed, deteriorated or disturbed by the construction of culverts, fill work, structures and related activities (e.g., clearing, access roads, armour rock, riprap, cofferdams, watercourse straightening upstream and downstream from culverts, etc.).

CA-090

Reference: Part 4, Volume 1, Section 7.3.3.1

The DFO's position is that directional drilling is the preferred method for all of the watercourses. Indeed, this method makes it possible to install the pipe under the watercourse with very little disturbance to the banks and the bed. However, one of the potential impacts of directional drilling indicated in Table 7-8 is the probability that the drilling materials will diverge from the usual path and end up on the bottom of the river. To counter this impact, the impact statement includes plans for the installation of sediment barriers.

Questions/Comments:

- A. Specify the type of sediment barrier that the proponent plans to use and confirm that this barrier will be in place before the beginning of the drilling work.
- B. Add the following mitigation measure: Continuously monitor the watercourse during the drilling to detect any drilling mud spills.
- C. Prepare an emergency intervention plan in the event of a fracturing accident. This plan must include, among other things, measures to stop work, confine drilling mud and prevent spills into the watercourse, as well as cleaning and eliminating drilling mud and a plan to restore the milieu.

The medium/materials mixture produced by pulling the pipe through the cavity must be stored. The proponent plans to store it in reservoirs on the bank or in tanker trucks. A spill of this mixture in the watercourse could have an impact on the fish habitat.

- D. Plan a sufficient distance between the reservoirs and the watercourse in order to prevent the introduction of harmful substances into the water.

To refuel machinery and equipment, the proponent proposes a distance of at least 100 m from the crossings. However, while machinery maintenance could cause spills (oil, etc.), no distance has been proposed.

- E. Can the proponent guarantee that a distance of at least 30 metres will be maintained from the bodies of water for any machinery or equipment maintenance activity in order to prevent the introduction of harmful substances into the water?

CA-091

Reference: Part 4, Volume 1, Section 7.3.3.2

For the Etchemin, Chaudière and Beauvillage rivers, the proponent plans to employ directional drilling as its crossing method. In the event that directional drilling fails, an alternative scenario would be implemented. The open trench method, presented in Appendix G of Volume 3, could cause many impacts on fish habitat.

Questions/Comments:

- A. Provide alternatives that do not involve a temporary road that spans the entire width of the river and evaluate the duration of the work. Justify the choice of alternatives in terms of the impacts on fish habitat.

- B. Discuss the advantages/disadvantages of carrying out the work on one section of the river at a time.
- C. Confirm that blasting will respect the guidelines concerning the use of explosives in Canadian fisheries waters (Canadian Technical Report of Fisheries and Aquatic Sciences 2107, Wright and Hopky, 1998).
- D. Describe the type of sediment barrier the proponent plans to use.
- E. Specify the planned fish repellent measures in order to distance them from the work area.
- F. Plan for an area sufficiently distant from the watercourse for pouring the concrete pipe.

In the event that the construction of a temporary road becomes necessary:

- G. Evaluate the duration of the construction, use and decommissioning of the temporary road.
- H. Describe how the decommissioning of the temporary road will be carried out, ensuring that the rocks from the borrow pit are completely removed from the riverbed and comment on the capacity of the environments to be restored.
- I. Where possible, describe the impacts and estimate the areas of habitat and the fish habitat functions (below the mean high water level) that will be destroyed, deteriorated or disturbed by the open trench method.

CA-092

Reference: Part 4, Volume 1, Section 8.3.1.2

On page 4.23 of the impact statement, it is stated that the most common accidents are pipe breaks caused by digging. However, on page 8.5 it is indicated that some accidents are also caused by corrosion, manufacturing defects, mechanical defects, etc. External dangers are also identified (gully erosion and river bank erosion, etc.) and sensitive elements such as river crossings are highlighted on page 8.6. Consequently, it is likely that a pipe break could occur under or in proximity to a watercourse.

Questions/Comments:

- A. Discuss the expected impacts of a pipe break on water quality and fish habitat.
- B. Present an intervention plan for a break occurring within or in proximity to a watercourse and the method that would be employed to repair the pipe.

CA-093

Reference: Part 4, Volume 1, Section 9.1.2

The impact statement indicates that when the construction activities begin, daily monitoring will be conducted to ensure that the authorization conditions, particularly with respect to mitigation measures, are respected. The main elements that will be subject to environmental monitoring are cited but no detailed plan is provided.

Question/Comment:

The proponent shall submit a detailed monitoring plan for work executed in the watercourses, among other things, to control suspended solids in the water and to verify the effectiveness of the mitigation measures.

CA-094

Part 4, Volume 1, Section 9.2.2

On page 9.6, the proponent cites the environmental components that could be subject to monitoring. Fish habitat is among these components, specifically the stability of the bed, banks and slopes of all of the watercourses and the substrate quality for the watercourses deemed vulnerable in the characterization study.

Question/Comment:

Could the monitoring program be applied to the watercourses in information sheets 3, 4, 6, 15, 19, 22, 23, 24, 26, 31 and 33?

CA-095

Reference: Part 4, Volume 4, Appendix A

The summary information sheets for the watercourses stipulate that all preparatory work (stripping top soil, berm construction, pipe welding, etc.) be done before excavation begins. The impacts on fish habitat are reduced when excavation work starts immediately after the preparatory work.

Question/Comment:

In the event that clearing is done, estimate the anticipated time lapse between the beginning of the excavation work and the preparatory work.

CA-096

Reference: Part 4, Volume 4, Appendix A

Each summary information sheet for the watercourses, in the section pertaining to construction method, contains the following note:

"The culvert will be installed during preparation of the work area. It will remain in place for the entire period of the execution of the work and following closure of the site if the work was not completed." [translation]

The duration of the installation of the culverts must be clarified.

Questions/Comments:

- A. Did the proponent anticipate the installation of portable structures for the watercourse crossings that would reduce the impact on fish habitat, such as a solid deck or a portable bridge?
- B. Specify the anticipated duration of the installation of the culverts in the context of the execution of the Rabaska and St. Lawrence pipeline projects.
- C. Describe the methods for decommissioning the access roads and culverts.

In the event that the duration extends into the spawning period for fish species present in the watercourses, the culverts should be withdrawn or the proponent shall commit to ensuring the free passage of fish for the watercourses in the following information sheets: 3, 4, 6, 15, 19, 22, 23, 24, 26, 31 and 33. This list could be reviewed following receipt of the characterization of the 9 watercourses that are to be inventoried in 2006. If the culverts were to be installed for a period of more than 2 years, all of the crossings must permit the free passage of fish unless it has been demonstrated that there is a natural obstacle to their free passage at the site of the work or nearby, or that the movement of fish upstream is not necessary (poor quality habitat).

In terms of design, prioritize clear-span structures (clear-span bridge, arched culvert, footbridge). These are the preferred structures because they maintain the natural water flow conditions and avoid encroachment on fish habitat by conserving the physical characteristics around the natural watercourse, that is, the substrate, slope and width. To achieve this, the clear span must have a minimum width equivalent to the width of the watercourse (bank-high-flow¹) in addition to the space necessary to install its footings and their protection.

When the installation of a clear-span structure is technically difficult, a closed culvert (with apron) can be installed if the natural slope of the crossing site is less than 0.5%. The closed culvert must:

- have a narrowing of less than 20% of the bank-high-flow;
- ensure a minimum water depth of 200 mm at all times in the culvert. To achieve this, the elevation of the first stable weir downstream from the culvert must be at least 200 mm higher than the elevation of the apron upstream from the culvert. This may require the construction of a weir downstream from the culvert. This weir must be located at a distance of approximately 3 times the diameter of the culvert, it must ensure free passage, be resistant to floods and sufficiently impermeable to prevent the water from percolating through it;
- include an energy stilling basin downstream from the culvert

Other options also maintain the free passage of fish while limiting the impacts on fish habitat. Here are two examples, although they require detailed analysis:

- Deeply buried culvert. The concept is to simulate the natural watercourse (width, slope and substrate) inside the culvert.
- Culvert with spillways. This type of structure is accompanied by successive water basins in the culvert in order to create conditions similar to a migratory fish pass.

Question/Comment:

D. The proponent shall explain how it plans to ensure the free passage of fish for the watercourses mentioned, and in function of the duration of its installation.

CA-097

Reference: Part 4, Volume 4, Appendix A

The summary information sheets for the watercourses state: “The proposed construction method and sediment control plan could be adjusted during installation of the gas pipeline, in function of the watercourse flow and the materials encountered during excavation.”

Question/Comment:

Describe all of the possible sediment control scenarios and material used, and specify the conditions under which they will be used.

¹ The width of a watercourse is defined by the width at bankfull discharge, which generally corresponds to the distance between the top of the banks, at the lower limits of the flood plain. The bankfull discharge width is generally determined based on physical indicators such as exposed tree roots, an abrupt change in the coastal slope, the marked presence of erosion, etc.

CA-098

Reference: Part 4, Volume 4, Appendix A

In the section pertaining to restoration in the summary information sheets, it is indicated that bank stabilization will be achieved through seeding or stone packing or a combination of both. In the context of this project, it appears that most of the watercourses could be restored through seeding given the potential advantages of this method for fish habitat.

Questions/Comments:

- A. Could bank stabilization through seeding be the preferred approach?
- B. Discuss the criteria used in the choice of restoration methods.
- C. Detail each of these methods.

CA-099

Reference: Part 4, Volume 4, Appendix A

In the summary information sheets on watercourses, the proponent mentions that a restriction period must be respected for the 9 watercourses in order to mitigate the impacts on fish habitat. The watercourses with information sheet numbers 3, 23, 24, 31 and 33 have the characteristics of a natural environment and can respond to several functions for the fish (nursery, feeding, etc.).

Question/Comment:

Explain why no restriction period was presented for the watercourses with information sheet numbers 3, 23, 24, 31 and 33.

Questions and comments from the City of Lévis

CA-100

Reference: Part 3, Volume 1, Section 4.12

The impact statement does not provide information on the site closure phase. The City of Lévis asks that this phase of the project be described and evaluated to satisfy Section 3.3 of the federal and provincial directive. The proponent mentioned that demobilization of the site shall be done in compliance with regulatory requirements in effect.

Question/Comment:

The proponent shall present a site closure plan. It would be appropriate for this plan to address the decommissioning of infrastructures (recycling, recovery and reuse of wrecking equipment) and site restoration (decontamination and restoration of agricultural function) and that the negative effects of these activities be evaluated.

CA-101

Reference: Part 3, Volume 1, Section 6

The description of the project components and host environment was too brief and, consequently, the prediction of negative impacts was also too general. For example, it is difficult to identify the periods that would be the least disturbing for carrying out some of the work.

Question/Comment:

In the case of the pile driving, the execution period, duration of the work, work schedule and equipment used should be specified in order to be able to evaluate the disturbance it will cause.

CA-102

Reference: Part 3, Volume 1, Section 6.3.5

The directions note that the proposed mitigation measures are vague for construction-related activities. Without questioning the proponent's good intentions, some of the stated measures could in themselves be harmful or have significant negative effects. For example, the proponent's commitment to permit agriculture on 65% of the land that will be purchased (for construction of the terminal) is designed to reduce the project's negative impacts on the use of the territory.

Question/Comment:

The measure must, however, be accompanied by a commitment by the proponent to maintain the rural character of this land and promote agricultural practices that comply with sustainable development objectives.

CA-103

Reference: Part 3, Volume 1, Section 6.3.6

The impact statement does not provide a clear assessment of the impacts related to the presence and use of an LNG terminal on the planned activities as part of the project to establish a pleasure boat navigation route along the river, namely the "Route Bleue." This route as planned will cross the study area.

Question/Comment:

Determine the implications of the presence and use of the terminal on the “Route Bleue,” a project currently under development in collaboration with the Québec canoeing and kayaking federation.

CA-104

Reference: Part 4, Volume 1, Section 7.4.3.2

Route 132 is used as the right-of-way to the Route Verte in the Rabaska implementation area to the degree that the proponent should limit the number and use of access roads starting at Route 132 to avoid any conflict in use, during the construction phase as well as once the project is operational.

The proponent shall present a layout of a bypass that would enable the continued use of the bicycle path. The impacts could be mitigated by taking low use times into account (spring and fall).

Questions/Comments:

- A. Specify the duration and period of the work.
- B. In order to reduce the impacts, the proponent plans to ask Transports Québec to authorize the construction of an access road from Highway 20. What is the proponent’s plan if the MTQ refuses this request?

CA-105

Reference: Part 3, Volume 1, Section 2.4.6

The impact statement mentions trapping and hunting activities in the region. The City of Lévis considers it important to properly document any issues related to land mammals, avifauna and threatened species.

Question/Comment:

We would like assurance that all inventories were conducted according to accepted practice, and that the impact statement will ensure that the Rabaska project can be completed in respect of the biodiversity of this ecologically rich environment.

CA-106

Reference: Part 3, Volume 1, Section 4.15.2

Question/Comment:

The City hopes to obtain specifications on lighting in the facilities (type of lights, lumen number, height, orientation of the lights, etc.), in order to assess the disturbance for residents and drivers using nearby roads. A three-dimensional simulation would be appreciated.

CA-107

Reference: Part 3, Section 6.2.14

The impact statement indicates that on the 45.5 ha of cleared land, only 10 ha will be reforested, and the rest will be seeded with grass. In order to maintain the biodiversity of the territory (no loss in terms of clearing), the City asks that the reforested areas be equivalent to 45.5 ha.

Question/Comment: The proponent shall indicate how and where it plans to compensate its clearing activities.

CA-108

Reference: Part 3, Volume 1, Section 8.5.6

Question/Comment: Specify the duration of monitoring that will be conducted to ensure plant recovery.

CA-109

Reference: Part 3, Volume 1, Section 6.3.8.4

The proponent plans to inventory domestic wells, located within the expected area of lowered groundwater (construction of the access road), in order to better specify potential impacts.

Question/Comment:

It would be desirable to proceed with this inventory as fast as possible in order to integrate this information in the final version of the impact statement and to also include the wells likely to be affected by the lowering of the water table, during the operational phase.

CA-110

Reference: Part 3, Volume 1, Sections 8.5.3; 8.5.4; 8.5.5

The proponent proposes the monitoring of the water table (8.5.3) and the water quality of domestic well water, close to facilities (8.5.4). However, monitoring will only be implemented during the operational phase. No follow-up is proposed during the construction phase.

Question/Comment:

Specify the monitoring to be implemented during the construction phase to ensure drinking water supply to homes located close to the site. Specify the number of homes that will be included in the monitoring (construction and operational phases) as well as the duration of monitoring.

CA-111

Reference: Part 3, Volume 1, Sections 4.9 and 6.3.8.1; Part 4, Chapter 2, 5 and 7

The information pertaining to road transportation (traffic flow, type of vehicle permitted to use the road, etc.) is limited and insufficient to adequately assess the scope of the impacts.

Question/Comment:

In order to assess the impacts of the construction of the pipeline and terminal on the road system, the proponent shall provide the preferred road layout, the types of vehicles that will be using the

road system, the frequency and times. A study shall be conducted of the traffic flow and the transit capacity of the roads that will be used.

Questions and comments from non-governmental organizations and the public

CA-200

Reference: Part 2, Appendix F-4

Since the decision was made to implement this project in Lévis—a “new project” according to the proponent—no consultation has been held in the implementation sector. Only three information sessions for the general public have been held (Part 2, Appendix F-4). Consequently, Section 5 of the introduction of the federal directive has not been satisfactorily fulfilled.

Question/Comment:

We ask that the proponent resume its consultation process, giving priority to the municipal sectors most affected.

CA-201

Reference: Part 3, Volume 1, Section 3

Question/Comment:

The costs of the alternatives described, including those from the Maritimes, must be assessed. Moreover, the proponent does not analyze, in the proposed alternatives, the LNG terminal project accepted in Nova Scotia (Bear Head in Goldboro) and the one proposed by Cacouna Energy in Gros-Cacouna. The proponent shall take these projects into account in the justification of its project.

CA-202

Reference: Part 3, Volume 1, Section 2.4.10

Questions/Comments:

- A. A heritage inventory was conducted, but it was enumerative and limited. It contains no analysis of the overall value of the cultural landscapes. This deficiency must be addressed. Moreover, no heritage inventory was conducted on the Saint-Roch road in Beaumont and Saint-Joseph-de-Lévis (close to the reservoirs).
- B. In addition, since Île d'Orléans is a national historic district, the proponent shall prepare an exhaustive inventory of the heritage buildings and historic sites affected visually or by other environmental impacts of its project, including passage of the LNG tanker given its danger area. This inventory must be conducted for the entire south shore of the island, between Sainte-Pétronille and Saint-François.

CA-203

Reference: Part 3, Volume 2, Figure 2.15

In the study area (Figure 2.15), we have noted that the regional park of La Martinière is not included, yet it is located only two kilometres from the jetty project.

Question/Comment:

We ask that a complete inventory of current scenic views on both sides of the river and a more in-depth visual study be conducted demonstrating the exceptional scenic quality of the river landscapes (the remarkable scenic views of the river, from route 132, Saint-Joseph street and La Martinière park).

CA-204

Reference: Part 3, Volume 1, Section 2.2.10

The proponent did not conduct any analysis of the river water in the chosen sector. The proponent refers to regional data, while water in this sector has contamination levels that are much lower than in the urbanized area, including bacteriological contamination.

Question/Comment:

Analyses and characterizations of current river water need to be conducted at the location of wastewater release from the atomizer.

CA-205

Reference: Part 2, Appendix F-2

To develop scenarios of collisions or stranding of LNG tankers, the proponent uses as its key variable the millions of kilometres crossed on the high seas by these types of ships over the last 40 years.

Question/Comment:

We ask that the public be provided with scenarios of accidents and incidents developed on the basis of past situations in which LNG tankers were in port or river areas similar to the proposed site.

CA-206

Reference: Part 2, Appendix F-2

Question/Comment:

The impact statement refers to accidents/incidents related to approaches and berthings in maritime ports. However, for most of the units of comparison, maritime traffic is parallel in a maritime area whereas on the St. Lawrence, the traffic is "queued," which poses a very different risk of collision or ramming.

CA-207

Reference: Part 2, Appendix F-2

In a context of difficult environmental conditions, the length of ships and, more specifically, their manoeuvrability have a decisive impact on risk level. Moreover, the impact statement does not take into account that over the course of the next few decades larger LNG tankers will be developed.

Question/Comment:

Did the various accident scenarios take into account the growing number of super tankers (the number of which is increasing with Ultramar's successive production increases), LNG tankers and container ships travelling to and from the port of Montréal?

CA-208

Reference: Part 2, Appendix F-2

In the approach area and for the turnaround manoeuvre and berthing operations, it has been established that there must be at least 1 km visibility and winds below 46 km/h.

There have been significant climate changes over the last few years (storms, strong winds).

Question/Comment:

To support its demonstrations, why does the proponent only use data from a single year, 1994?

CA-209

Reference: Part 2, Appendix F-2

In the analysis of wind and fog factors, Saint-Romuald is used as the reference site. However, the wind phenomenon should be analyzed in the southern arm of Île d'Orléans. The wind coming from the east, strengthened from Cap Tourmente, gradually loses its strength at Saint-Romuald and often completely dies down upstream from Québec City. In light of this, one cannot compare a turnaround manoeuvre for an oil tanker in Saint-Romuald to that of an LNG tanker in the proposed area of the mooring site.

Question/Comment:

Why use Saint-Romuald as the reference site?

CA-210

Reference: Part 2, Appendix F-2

To analyze the approach conditions from the eastern tip of Île d'Orléans to the terminal, as well as the turnaround and berthing conditions, the impact statement should specify the number of 60-minute periods of fog and the number of 60-minute periods of heavy snow (with less than 1 km visibility).

Furthermore, for every month of the year, we should be provided with the number of 60-minute periods characterized by winds above 46 km/h over this short southern route from Île d'Orléans to the terminal.

CA-211

Reference: Part 2, Appendix F-2

The DNV report (p. 42) states that "the wind should not pose any particular problems since the site is well sheltered and the wind blows primarily along the axis of the river and the mooring station."

Question/Comment:

Is the site still well sheltered 600 metres from the bottom cove, almost in the middle of the river where the mooring station is located? We ask that specific wind measures be taken at the level of the mooring station.

CA-212

Reference: Part 3, Volume 1, Section 6.5, p. 6.138

Questions/Comments:

- A. Cumulative environmental impacts: The impacts of past projects, in particular the 735 kV lines and Highway 20 are not addressed. While it is likely that little quantitative information exists on the impacts of these two projects, the proponent shall at least provide their execution dates and present aerial photos indicating land use before their construction.
- B. For the river, the proponent shall, using aerial photos, indicate shoreline conditions before the construction of the 735 kV lines compared to today.

CA-213

Reference: Part 3, Volume 1, Section 6.5

Some historical data on fish abundance and diversity in the river are provided in Section 2.3.2.2 and Section 2.6.4.4.

Question/Comment:

A summary of this information should be provided for the cumulative impacts.

CA-214

Reference: Part 2, pages xix to xx

Questions/Comments:

- A. Most of the units of measurement of natural gas and liquefied natural gas (LNG) cause confusion. It would have been useful to always provide gas and LNG measurements in m³.
- B. Some mistakes were identified in the list of symbols and units of measurement and conversion factors (T-2, pp. xix, xx).

Here are the corrections, indicated in bold and underlined:

Time	<u>s</u> <u>min</u> <u>h</u> <u>d</u> <u>m</u>	
Length		
Pressure	kPa	1,000 <u>Pa</u> (10 ³)
Mass flow	t/year	Note: 8760 t/year = 1 t/h therefore: 1 ÷ 8760 = <u>0,0001142</u> t/h
Volume flow (liquid)	m ³ /j m ³ /year pi ³ /day pi ³ /year	1 ÷ 24 = <u>0.04167</u> m ³ /h 1 ÷ 8760 = <u>0.0001142</u> m ³ /h 1 x 0.0283 ÷ 24 = <u>0.001179</u> m ³ /h 1 x 0.0283 ÷ 8760 = <u>3.231 x 10(e-6)</u> m ³ /h
Energy	<u>kWh</u>	

CA-215

Reference: Part 3, Volume 1, Section 6.3.5

Questions/Comments:

- A. What pressure will Rabaska place on the homogeneity of the surrounding agricultural environment?
- B. What are the anticipated impacts on land occupation, particularly with respect to the pressure of residential and commercial development that usually follows the introduction of a founding industry such as this?
- C. Will other industries be added to Rabaska?
- D. Will a new industrial park be created?
- E. We would like the coexistence of agriculture and the LNG terminal to be documented. Does this reality exist elsewhere? If so, are there conflicts or limitations on agricultural use?

CA-216

Reference: Part 3, Volume 1, Sections 2 and 6

With respect to the aquatic environment, there is no description of the current levels of nocturnal light in the locations where a significant increase in light is planned for the purposes of the project (1 entire night of unloading every 6 days).

Questions/Comments:

- A. Will there be an impact on eel migration (they migrate primarily on moonless nights), on other fish migrations, including rainbow smelts which, in 2003, were recommended a vulnerable population?
- B. Will there be an impact on the migration of geese and Canada geese that also migrate at night?
- C. What will the impact of this light be on the residents of Île d'Orléans living directly across from the terminal? Will there be any impact on their property values?

CA-217

Reference: Part 3, Volume 1, Section 6.3.12

The proponents shall provide a map indicating the underwater noise levels before the project is executed and the anticipated levels during construction and during the operational phase.

The concept of underwater noise levels is relevant because the plan is to use 6 MW of power to empty the LNG tanker (approximately 7000 horsepower) for the entire transfer period (approximately 15 hours per boat, once every 6 days). Assess the impacts on aquatic fauna.

Questions/Comments:

- A. Will the booster pumps at the foot of the cliff make noise? The noise maps provided do not seem to indicate this.
- B. Will the three 16-inch aerial transfer pipes on the dock and the bridge also be silent when the transfer is occurring? The noise maps do not seem to indicate their presence either. Will these 3 pipes also be silent during cooling and heating?
- C. Transfer noise was assessed for residents of the south shore but will the residents of Île d'Orléans located directly across from the terminal hear and be disturbed by this noise? Could there be a negative impact on the property values and over what distance?
- D. What will be the impact of noise on fish migration or their use of the sector (channel and

shores).

- E. Could there be an impact on the flight of migrating birds along the river or that flock to the Beauport sandbars?

CA-218

Reference: Part 3, Volume 1, Section 7

Questions/Comments:

- A. In the event of a LNG tanker running aground or colliding in this section of the river, what would be the impact of blocking the St. Lawrence? Stalled maritime traffic and its certain impact on the economy of the entire St. Lawrence watershed and Great Lakes?
- B. What unloading techniques are planned? How much time will be required for unloading?
- C. What will the behaviour of the LNG tanker structure be if it were grounded during high tide upstream from Île aux Coudres (during spring tide, the water level can vary from 6 to 0 m, in the St. Lawrence tide conditions)?
- D. If a LNG tanker spill occurred, what emergency measures have been planned to protect the riparian populations from a gas fire?

CA-219

Reference: Part 3, Volume 1, Sections 6.3.6 and 7

Questions/Comments:

- A. In the event of major winds, unforeseen ice jams or technical or mechanical problems preventing landing or requiring emergency departure from the dock, where would the LNG tankers set down anchor in this area of the river?
- B. Will the LNG tankers have to return toward the urban area of Québec-Lévis if they are moored with the bow pointed upstream?
- C. Will the security area around an anchored LNG tanker be increased to take into account its movement around the mooring point?
- D. Will it have an impact on commercial navigation up and down the river?
- E. Will it have an impact on recreational boating?

CA-220

Reference: Part 3, Volume 1, Section 7

The cryogenic pipe is considered secure because it is embedded in a concrete caisson.

Question/Comment:

What past experience confirms that the cryogenic pipe can cross a busy road like Route 132?

CA-221

Reference: Part 3, Volume 1, Section 7

The proponent does not in any way take into account the possibility of a terrorist attack on these facilities. Yet the risk is real as confirmed by the concerns of our American neighbours.

Questions/Comments:

- A. What preventive measures are envisaged?
- B. Do the neighbouring Hydro-Québec installations make this a more attractive target for a terrorist attack?

CA-222

Reference: Part 3, Volume 1, Section 7

Two schools (Ste-Famille and La Marelle) are located respectively 1 km and 3.5 km from the jetty.

Question/Comment:

What evacuation plan does the proponent plan to put in place in the event of a spill or accident?

CA-223

Reference: Part 3, Volume 1, Section 7

There is no major burn unit at the Hôtel Dieu hospital in Lévis.

Question/Comment:

What measures does the proponent plan to take to ensure that the local hospital will have all of the equipment required in case of an emergency so that no additional delays are incurred by having to transfer victims to another hospital?

CA-224

Reference: Part 3, Volume 1, Section 7

Question/Comment:

In Section 7.3.4, no analysis is made in the event of a spill in icy waters, that is, an LNG spill in free water surfaces between the ice while the ice is moving. LNG vapour dispersion modelling for the St. Lawrence does not take into account severed mooring ropes or if an LNG tanker is set adrift. Why?

CA-225

Reference: Part 3, Volume 1, Section 7

Questions/Comments:

- A. Do nearby high-tension wires present an increased risk? The proponent shall provide studies conducted by Hydro-Québec addressing this issue.
- B. What is the impact of magnetic fields created by these lines in the event of a natural gas spill or leak?

CA-226

Reference: Part 3, Volume 1, Section 6

On page 6.79 of Part 3 of Volume 1, it is stated that if the site is accessed via Route 132, the cross-country trail in Ville-Guay could be used. However, Figure 2.8 in Part 3, Volume 2, Figure 6.6 in Part 3 and the figure on page 7 of the summary distributed to the public, would indicate that the access road to the terminal from Route 132 would cut across several cross-country ski trails. Thus, trail number 3 would be cut in two places, trail number 4 also in two places, while trail number 5 largely cuts through the main work site. Since construction is planned for four years, and given that the access road will remain during the operational phase, it seems that the operations of the Ville-Guay cross-country ski centre will be greatly affected.

Question/Comment:

Has Rabaska clearly informed the population and users of the cross-country ski centre of the expected impacts?

CA-227

Reference: Part 3, Volume 1, Section 2.3.1

In its St. Lawrence habitat restoration plan in Chaudière-Appalaches,² CRECA indicated a small population of Eastern hemlock in the riparian sector located between Pointe de la Martinière and the Hydro-Québec pylons. Populations of Eastern hemlock are rare on the coast of Chaudière-Appalaches. In the impact statement report, the project initiator does not mention this species.

Questions/Comments:

- A. Is this species present in the study area?
- B. If so, what measures have been planned to mitigate the impact on this type of population?

CA-228

Reference: Part 2, Table 5.1

The proponents met Mr. André Bélisle, President of the Association québécoise de lutte contre la pollution atmosphérique, as well as members of the Board of Directors of the Conseil régional de l'environnement de Chaudière-Appalaches, during an information meeting on June 6.

Question/Comment:

There was no mention of this in Table 5.1 of Part 2.

CA-229

Reference: Part 3, Table 4.18

Question/Comment: What are the applicable standards for the liquid waste released into the St. Lawrence River presented in Table 4.18 of Part 3?

CA-230

Reference: Part 3, Volume 1, Section 6.5

Questions/Comments:

- A. Are modifications or expansions of Rabaska facilities or other related facilities, such as a large thermal power plant, planned?
- B. If so, an assessment of the cumulative environmental impacts of these future projects should be conducted.

CA-231

Reference: Part 2, Section 2.5

The proponent basis, in part, its justification of the Rabaska project on the hypothesis that institutional and industrial clients, who over the last few years have been turning toward natural

² J.F. Allaire and I. Parent, *Plan de restauration des habitats du Saint-Laurent en Chaudière-Appalaches. Caractérisation et proposition de restauration du milieu riverain*. Conseil régional de l'environnement de Chaudière-Appalaches. Report presented to the Fondation de la faune du Québec and Saint-Laurent Vision 2000, 2004, 180 p.

gas, will replace natural gas with heating oil due to the rising price of natural gas. The impact statement requires additional information to clarify this hypothesis.

Questions/Comments:

- A. What is the forecasted growth in the demand for heating oil by 2025?
- B. What is the forecasted evolution of heating oil prices by 2025?
- C. To what point must the price of natural gas decrease to prompt a substitution of heating oil with natural gas?

CA-232

Reference: Part 3, Volume 2, Appendix A

Question/Comment:

In the case of the study area retained for the terminal, we estimate that the scale of the map used to present the components of the environment (e.g., Fig. 2.6; T3, V2, Appendix A) is not always adequate, since a lot of information cannot be discerned with a scale of 1 : 40,000. For example, there is only nominal information on forest tree populations (types of populations, age, density) which would have been more visible at a scale of 1 : 20,000 or 1 : 10,000, as used in the MRNF's ecoforestry maps. It would be preferable to provide this information on a larger scale so that the reader can better locate the relevant components of the study environment.

CA-233

Reference: Part 4, Volume 1, Section 2.4.6

In the case of the layout of the pipeline, two major wetlands border or are crossed by the proposed pipeline layout: the Saint-Jean-Chrysostome peat bog and the Saint-Étienne-de-Lauzon peat bog.

Question/Comment:

In the case of this peat bog, did the proponent take into account some of the uses of this environment in its description, particularly the presence of a moose hunting ground?

CA-234

Reference: Part 2, Section 4

In order to determine which of the two proposed sites, Cacouna and Lévis-Beaumont, is best suited for the terminal, several questions must be clarified.

Questions/Comments:

- A. What are the anticipated delivery delays for the Cacouna sector with respect to the reservoirs' storage capacity? Do these delays alone truly justify the choice of the Lévis-Beaumont site?
- B. What data supports the claim that the general navigation conditions are better in Lévis than in Gros Cacouna?

CA-235

Reference: Part 3, Volume 1, Section 3.2, pages 3.1 to 3.15

The project options presented focus exclusively on the location of the terminal. The proponent indicates in the impact statement the technological and environmental choices retained at the

time of the project's design that informed the decisions regarding component location. In terms of the jetty location, only one site was proposed and retained, while for the land facilities, three options were compared.

Question/Comment:

Can the proponent propose options that take into account the integration of the project in the environment?

CA-236

Reference: Part 3, Volume 1, Section 6.1.2

Questions/Comments:

- A. Will the proponent retain equipment that will generate the lowest greenhouse gas emissions?
- B. Has the proponent planned to add technology that will reduce greenhouse gas emissions (for example CO₂ sequestration)?

CA-237

Reference: Part 3, Volume 1, Section 6.1.6

A review of the document provided by the proponent did not include any information on the capacity of the proposed sedimentation basin to receive drainage water from the site in relation to the surface area drained.

Question/Comment:

The proponent shall better specify how drainage waters will be managed, given that the proposed site includes a significant reserve of shallow aquifers.

CA-238

Reference: Part 3, Volume 1, page 6.33

The plan is to discharge the atomizer waters into the river, without any mention of the impact on the host environment. The impacts associated with these discharges of hot water into the river, particularly for fish habitat, are poorly substantiated.

Question/Comment:

The proponent shall provide information on this topic and better document this impact which will be ongoing through the operational phase.

CA-239

Reference: Part 3, Volume 1, Section 6.1.1

The proponent reports that less than 1% mercaptan is added to natural gas to detect its presence.

Questions/Comments:

- A. What will be the frequency of natural gas leaks from the terminal and what will be the dispersion pattern of mercaptan odours?
- B. Will odour problems related to the use of mercaptan be monitored?

CA-240

Reference: Part 3, Volume 1, Section 6.1.1

The proponent mentions that an exit on Highway 20 will be adapted during the construction phase to reduce negative impacts on air quality, particularly for dust and noise.

Question/Comment:

Why didn't the proponent study an option to build a temporary access road to the construction site from the interchange at Lallemand road, rather than developing an access directly from Highway 20 and thereby increasing the risk of accidents on a busy highway?

CA-241

Reference: Part 3, Volume 1, Section 6.2.2.3

The description of the jetty, which will be built on piles, gives the impression that it will be easily crossed and that during spawning migration, fish will not hesitate to cross underneath. Its impact, however, could combine with that of the electrical pylon foundations located just downstream.

Many organizations interested in fauna joined forces to reintroduce white bass in the St. Lawrence. Some 2000 bass have been introduced since 2001 and preliminary data obtained through recapture of some of them indicate that these fish occupy the same distribution area as the previous population.

It is difficult to take the white bass into consideration in the impact statement of a project like Rabaska since this species was absent for about 40 years; the individuals in the new population are still very small in number.

Question/Comment:

What does the proponent plan to do to prevent the presence of the terminal from reducing the chance of success of the white bass repopulation program?

CA-242

Reference: Part 3, Volume 1, Section 6.3.14.2

Analysis of the impact on the visual environment is based on summary images that give an idea of the project's visual impact from various viewpoints. The only site retained on the south shore of the river to assess the visual impact of maritime facilities is the Pointe-de-la-Martinière sector which is located over 3.5 km from the proposed facilities. Several observation points located 500 m to 3 km from the terminal facilities could have been considered in the visual impact analysis, for example the Domaine des Pêches in Lévis, the river portion of Vitré road in Beaumont or Antoine Drapeau park in Beaumont.

Question/Comment:

Specify the criteria used to select the strategic viewpoints.

CA-243

Reference: Part 3, Volume 1, Section 7

Several LNG terminals are currently in operation around the world with apparently impeccable security records.

Question/Comment:

Are these LNG terminals located close to a major maritime channel or are they located in more remote areas?

CA-244

Reference: Part 3, Volume 1, Section 7

Question/Comment:

References, such as Jerry Heaven, ABS Consulting and Sandia, seem to locate the danger zone of an LNG terminal between 1.8 and 5.5 km. In California, since 1977, an LNG terminal cannot be established less than 6.5 km from residential areas, whereas the security perimeter for Rabaska is 400 metres.

CA-245

Reference: Part 3, volume 1, section 2.4.5.3

Question/Comment:

In the landholding section, the proponent shall provide the exact number of owners located in the study area and provide the status of these properties (residential, commercial, agricultural, etc.) for Lévis, Beaumont and Île d'Orléans.

CA-246

Reference: Part 3, Volume 1, Sections 6.1.6 and 6.2.2.4

The impact statement seems to indicate that unacceptable dumping in the Saint-Claude Creek, for example nitrites, nitrates and hot water, is acceptable if dumped in the river.

Questions/Comments:

- A. Did the proponent examine other procedures and methods for limiting the impact of evaporator waste on fish habitat?
- B. What is the available dilution in the river that allows the proponent to claim that nitrite and nitrate levels will meet standards?

CA-247

Reference: Part 3, Volume 1, Section 6.5

The Ultramar refinery, municipal incinerators, the Frito-Lay plant and the Stadacona plant are already major sources of atmospheric pollution.

Question/Comment:

Were these projects taken into account in the analysis of cumulative environmental impacts?

CA-248

Reference: Part 2, Section 5, Tableau 5.1

The following organizations are not included in Table 5.1.: Amis de la Grande Plée Bleue, Association pour la protection de l'environnement de Lévis, Rabat-Joie, Association maritime du Québec (AMQ) and Association de l'Île d'Orléans contre le port méthanier.

Question/Comment:

Indicate if these organizations were met or invited to the proponent's meetings.

CA-249

Reference: Part 3, Volume 1, Section 2.2.1

Question/Comment:

Why were wind measurement data from the Saint-François-de-l'Île-d'Orléans meteorological station not taken into account?

CA-250

Reference: Part 3, Volume 1, Section 6.2.1.3

Questions/Comments:

- A. With respect to the peat bog, the proponent shall describe in detail the major drainage work carried out in the past that justifies its characterization of this wetland as having already been disturbed.
- B. It is stated that a hydraulic connection between the surface water and the water table beneath the peat bog has not been clearly established. Are there plans to study this?
- C. If these studies confirmed a link, what mitigation measures would preserve the residual 5.9 ha portion of this environment?
- D. What would be the impact on the water supply and flow of the Saint-Claude Creek following a possible drying out of the peat bog located to the east of the reservoirs?

CA-251

Reference: Part 3, Volume 1, Section 6.3.6

The proponent states in point 6.3.6 that the areas around the maritime implementation zone are infrequently used by pleasure boaters, yet in point 2.4.6.1 it is stated that in the region encompassing the study area, there are 7 marinas and two sailing schools (the 4 closest marinas include over 600 sailboats and motorboats).

Question/Comment:

Can the proponent provide the references it used to conclude that there is infrequent use by pleasure boaters of the sector planned for the construction of the jetty?

CA-252

Reference: Part 3, Volume 1, Section 4.8.7.5

The proponent mentions that the gas sent to the Gazoduc TQM network does not require odourization.

Question/Comment:

If the gas present on the site is odourless, how will the nearby population detect a leak?

CA-253

Reference: Part 3, Volume 1, Section 6.1.7.6

According to Ouranos³, the potential decrease in flow could also displace the saltwater interface by 10 to 20 km upstream from the eastern tip of Île d'Orléans.

Question/ Comment:

- A. Describe the impacts of brackish water on the facilities that pertain to water intake from the river, for example, the regasification system, fire system, cleaning water, drinking water, etc.
- B. Indicate the salt water adaptation measures that should be put in place.
- C. Will a supplementary and/or different biocide be necessary to treat this brackish water? If so, specify if this water would also be discharged into the river and describe the environmental impacts.

CA-254

Reference: Part 3, Volume 1, Section 6.1.7.6

Ouranos³ also expects that climate change will lead to an increase in the frequency of extreme weather events, including an increase in storms associated with cyclone activity.

Question/Comment:

Indicate the impacts of climate change on the terminal activities and LNG tanker movements.

CA-255

Reference: Part 3, Volume 1, Section 6.3.12

Question/Comment:

In its analysis of noise and vibration impacts, did the proponent take into account the presence of sensitive locations such as schools, hospitals, daycares, retirement homes, religious sites and so on? A map indicated the noise levels at these sensitive locations, before and during project execution could be useful.

CA-256

Reference: Part 3, Volume 1, Section 6.3.12

Question/Comment:

Specify if anticipated noise levels in Table 6.16 are located at the most exposed façade.

CA-257

Reference: Part 3, Volume 1, Section 6.3.12

Question/Comment:

Indicate if the noise impacts were established taking into account temporary homes (including chalets and/or secondary homes). If these sites were not taken into account even though they are located within the study area, indicate the reason or include them for consideration.

³ Ouranos, S'adapter aux changements climatiques, 2004. www.ouranos.ca/cc/changclim9.pdf

CA-258

Reference: Part 3, Volume 1, Section 6.2.1.4

The proponent cites the Nantel and Gagnon (1993) study to assess the viability of wild leek plant cover in the study area. However, the reference provided in the bibliography is Nantel et al. (1996).

Questions/Comments:

- A. Provide the complete reference, include it in the bibliography or provide a copy of the study.
- B. Does the proponent plan to take measures to relocate the wild leek present in the study area or mitigate the impacts on this population?

REFERENCES

- Béland, P., R. Michaud, and D. Martineau. 1987. Recensements de la population de bélugas (*Delphinapterus leucas*) du Saint-Laurent par embarcations en 1985. Canadian Technical Report of Fisheries and Aquatic Sciences 1545: 21 pages.
- Biorex Inc. 1999. Caractérisation biophysique et des usages d'un secteur retenu pour la détermination d'une zone de protection marine dans l'estuaire du Saint-Laurent. Rapport produit pour le ministère des Pêches et des Océans du Canada en collaboration avec le Groupe de recherche et d'éducation sur le milieu marin (GREMM) et la Société Duvetnor Ltée. Volume 1, 2 and 3. Multiple pagination.
- Gosselin, J.-F., V. Lesage and A. Robillard. 2001. Population index estimate for the beluga of the St Lawrence River Estuary in 2000. Research Document 2001/049. Canadian Science Advisory Secretariat. 21 pages.
- Kingsley, M. C. S. and M. O. Hammill. 1991. Photographic census surveys of the St. Lawrence beluga population, 1988 and 1990. Canadian Technical Report of Fisheries and Aquatic Sciences 1776: 19 pages.
- Kingsley, M. C. S. 1993. Census, trend, and status of the St Lawrence beluga population in 1992. Canadian Technical Report of Fisheries and Aquatic Sciences 1938: 17 pages.
- Kingsley, M. C. S. 1996. Population index estimate for the belugas of the St Lawrence in 1995. Canadian Technical Report of Fisheries and Aquatic Sciences 2117: 38 pages.
- Kingsley, M. C. S. 1999. Population indices and estimates for the belugas of the St Lawrence Estuary. Canadian Technical Report of Fisheries and Aquatic Sciences 2266: 27 pages.
- Lavigueur, L., M. O. Hammill and S. Asselin. 1993. Distribution of seals and other marine mammals in the area of the proposed Saguenay marine park. Rapport manuscrit canadien des sciences halieutiques et aquatiques 2220: 40 pages.
- Lesage, V., C. Barrette, M.C.S. Kingsley and B. Sjare. 1999. The Effect of Vessel Noise on the Vocal Behavior of Belugas in the St. Lawrence River Estuary. Marine Mammal Science 15(1):65-84
- Lesage, V., M. O. Hammill, and K. M. Kovacs. 1995. Harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) abundance in the St Lawrence Estuary. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2307: 19 pages.
- Lesage, V., M. O. Hammill, and K. M. Kovacs. 2004. Long distance movements of harbour seals (*Phoca vitulina*) from a seasonally ice-covered area, the St. Lawrence River estuary, Canada. Canadian Journal of Zoology 82: 1070-1081.

- Michaud, R., 1993. Distribution estivale du béluga du Saint-Laurent; synthèse 1986 à 1992. Rapport technique canadien des sciences halieutiques et aquatiques 1906: 28 pages.
- Michaud, R. and V. Chadenet. 1990. Survolés aériens pour l'estimation de la distribution printanière des bélugas du Saint-Laurent. Rapport non publié présenté à Pêches et Océans Canada, Mont-Joli, Qc par l'Institut National d'Écotoxicologie du Saint-Laurent, Rimouski, Qc. 36 pages.
- Michaud, R., A. Vézina, N. Rondeau and Y. Vigneault. 1990. Distribution annuelle et caractérisation préliminaire des habitats du béluga (*Delphinapterus leucas*) du Saint-Laurent. Rapport technique canadien des sciences halieutiques et aquatiques 1757: 31 pages.
- Pippard, L. and H. Malcolm. 1978. White whales (*Delphinapterus leucas*). Observations on their distribution, population and critical habitats in the St. Lawrence and Saguenay rivers. The department of Indian and Northern Affairs, Parks Canada, Project C1632 – Contract 76-190. 87 pages.
- Robillard, A., V. Lesage, and M. O. Hammill. 2005. Distribution and abundance of harbour seals (*Phoca vitulina concolor*) and grey seals (*Halichoerus grypus*) in the Estuary and Gulf of St. Lawrence, 1994–2001. Canadian Technical Report of Fisheries and Aquatic Sciences 2613: 152 pages.
- Savaria, J.-Y., G. Cantin, L. Bossé, R. Bailey, L. Provencher and F. Proust. 2003. Summary of a scientific workshop on marine mammals, their habitats and food resources, held in Mont-Joli, Québec, from April 3 to 7, 2000, in the context of developing the St. Lawrence Estuary Marine Protected Area Project. Regional Oceans and Habitat Branch, Fisheries and Oceans Canada 2647: 127 pages. Internet: <http://www.qc.dfo-mpo.qc.ca/zpmestuaire/>)

Appendix 1

Preliminary comments from Natural Resources Canada LNG Facilities and Seismic Hazard Assessment

Issue: Appropriate seismic hazard assessment

The issue raised in our seismic hazard assessment review for LNG facilities is related to firstly to differences in the requirements of the CSA-Z276 code (which applies to LNG facilities/terminals) and the new National Building Code 2005 (to come into effect in 2005), and secondly to differences in requirements in Canada versus the adjacent U.S. These differences create the potential for designing a new LNG facility to a lower level of reliability than a new nearby apartment building, and to a lower level than across the border in the U.S.

Comments adapted from ESS's expert review of Irving Canaport EA

The 4th Generation seismic hazard model has been adopted as the basis for the forthcoming 2005 edition of the National Building Code of Canada. Developments since the seismic hazard model used in the 1985-1995 NBCC include (but are not limited to):

- refined recurrence statistics for the earthquake populations
- better appreciation of the maximum size of earthquakes to be expected (for example magnitude 6.0 was used for New Brunswick in 1982, while the 4th Generation model uses 7.0).
- new seismotectonic models to explain the origins of the earthquakes, and hence which earthquake clusters may form earthquake populations.
- new ground motion relations, better reflecting the strong short-period shaking to be expected in eastern Canada, reflecting the observed ground motions from the 1988 Saguenay earthquake.
- estimation of spectral ground motion parameters instead of peak motion parameters, allowing better design than using a scaled spectrum.

In addition to these and other improvements, the 2005 code will be based on seismic hazard computed for a 2% probability in 50 years (0.000404 per annum or 1/2475 years), which is believed to represent the actual performance achieved in most current buildings designed to the 1995 code. The new probability level is lower than that for the Safe Shutdown Event (0.001 per annum) in the current, 1989, version of CSA-Z276, though the SSE had been taken as the 0.0001 p.a. event in the 1981 version of the the CSA code. *Because of the potential consequences, it would seem **inappropriate** to design the LNG facility to a level of reliability lower than a nearby apartment building.*

Values for probabilities higher than 2%/50 years are considered to be reliable for the construction of standard buildings or similar reliability structures. Values for probabilities lower than 2%/50 years (i.e. the 1%/50 year value above) may be unreliable estimates of the true seismic hazard because they are generated using a nationwide model which must, of practicality, be very general. For example, the position of the seismic zone boundaries used to constrain the positions

of the earthquakes generating the hazard might be evaluated in the light of detailed local knowledge, leading to a higher or lower estimate of the hazard. *Thus for LNG plants a site-specific assessment of seismic hazard is required.*

Result of the ESS review and recommendations re. seismic hazard assessment for Canaport:

Irving committed to doing a site specific seismic hazard and risk assessment prior to doing the final tank design for their proposed Canaport Facility in N.B.

Implications for other LNG projects

A site-specific hazard seismic hazard and risk assessment is required. The probability level of the Safe Shutdown Event should be taken as 1% in 50 years (approximately 1/5000 years), because it (i) will give designs twice as reliable as for common buildings designed in Canada to the national building code and (ii) is commensurate with the LNG standard in the U.S.