
5.0 ENVIRONMENTAL ASSESSMENT METHODS

The methods that will be used to conduct the EIA/EA of the Project are described in this Chapter. The EIA/EA will be completed using the methodological framework developed by Jacques Whitford Stantec to meet the requirements of CEAA and the New Brunswick *Environmental Impact Assessment Regulation*. These environmental assessment methods are based on a structured approach that:

- Considers the mandatory and discretionary factors under Section 16 of CEAA;
- Focuses on issues of greatest concern;
- Considers all federal and provincial regulatory requirements for the assessment of environmental effects, as defined by the New Brunswick *Environmental Impact Assessment Regulation* and CEAA, with specific consideration of the requirements of the Final Guidelines and EA Track Report;
- Considers the issues raised by the public, Aboriginal persons, ENGOs, and other stakeholders during consultation and engagement activities conducted; and
- Integrates engineering design and programs for mitigation and monitoring into a comprehensive environmental planning process.

For the purpose of this EIA/EA, the term “environment” refers broadly to the combined biophysical and human environment and encompasses the definition of environment in CEAA where:

“environment” means the components of the Earth, and includes

(a) land, water and air, including all layers of the atmosphere,

(b) all organic and inorganic matter and living organisms, and

(c) the interacting natural systems that include components referred to in paragraphs (a) and (b).

The EIA/EA will focus on specific environmental components (called Valued Environmental Components or VECs) that are of particular value or interest to regulatory agencies, the public, and other stakeholders. VECs are typically selected for assessment on the basis of regulatory issues, guidelines, and requirements; consultation with regulatory agencies, the public, and stakeholders; field reconnaissance; and the professional judgment of the Study Team.

For the purpose of this EIA Report, the term “environmental effect” is as defined in CEAA and broadly refers to a change in the environment in response to a Project activity. Specifically:

“environmental effect” means, in respect of a project,

(a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the Species at Risk Act,

(b) any effect of any change referred to in paragraph (a) on

(i) health and socio-economic conditions,

(ii) physical and cultural heritage,

(iii) the current use of lands and resources for traditional purposes by aboriginal persons,
or

(iv) any structure, site or thing that is of historical, archaeological, paleontological or
architectural significance, or

(c) any change to the project that may be caused by the environment,
whether any such change or effect occurs within or outside Canada.

For convenience, the term “environmental effect” as defined in *CEAA* is used in this EIA Report, and shall be taken to be synonymous to the term “impact” as referred to in the context of the New Brunswick *Environmental Impact Assessment Regulation*.

It is noted that in the context of this EIA Report, the term “environment” includes the biophysical, human, and socio-economic components as defined in the *Clean Environment Act* and *CEAA*.

5.1 Overview of Approach

The environmental assessment methods will address both Project-related and cumulative environmental effects. Project-related environmental effects are changes to the biophysical or human environment that will be caused by a project or activity arising solely as a result of the proposed principal works and activities, as defined by the scope of the Project and described in the Project Description (Chapter 3). Cumulative environmental effects are changes to the biophysical or human environment that are caused by an action associated with the Project, in combination with other past, present and future projects and activities that have been or will be carried out.

Project-related environmental effects and cumulative environmental effects will be assessed sequentially using a standardized methodological framework for each VEC. The methodological framework will be generally consistent between VECs and standard tables and matrices will be used to facilitate the evaluation. The Project-related environmental effects will be discussed first, taking into account Project design measures and mitigation that may be implemented to reduce or avoid Project-VEC interactions that could result in this environmental effect. The residual Project-related environmental effect will then be characterized in light of planned mitigation. At minimum, all Project-related environmental effects will be characterized using specific criteria (e.g., direction, magnitude, geographic extent, duration, frequency, and reversibility) that are specifically defined for each VEC. The significance of the Project-related environmental effects will then be determined based on pre-defined criteria or thresholds for determining the significance of the environmental effects (also called significance criteria). If applicable, the likelihood of significant environmental effects will be characterized.

A cumulative environmental effects screening will then be conducted for that residual environmental effect to determine if there will be potential for cumulative environmental effects (the environmental effects of other projects and activities that would overlap with those of the Project) to occur. A series of questions will be used to screen cumulative environmental effects. On the basis of these questions, if there is potential for substantive cumulative environmental effects arising from the Project in combination with other past and likely future projects and activities that have been or will be carried out, it will be assessed to determine if those cumulative environmental effects could be significant and to consider the contribution of the Project to them.

The environmental effects assessment approach to be used in this EIA/EA will involve the following steps.

- **Scoping.** Scoping of the overall assessment, including the selection of Valued Environmental Components (and, if required, key indicators for the VEC); description of measurable parameters; description of temporal, spatial, and administrative/technical boundaries; definition of the parameters that will be used to characterize the Project-related environmental effects and cumulative environmental effects; identification of the standards or thresholds that will be used to determine the significance of environmental effects; and discussion of existing conditions. This step relies upon the scoping undertaken by regulatory authorities as outlined in the provincial Final Guidelines and the federal EA Track Report and Scoping Document; consideration of the input of the public, stakeholders, and First Nations; and the professional judgement of the Study Team.
- **Assessment of Project-Related Environmental Effects.** Project-related environmental effects will be assessed. The assessment will include descriptions of how an environmental effect will occur, the mitigation and environmental protection measures proposed to reduce or eliminate the environmental effect, and the characterization of the residual environmental effects of the Project. The focus will be on residual environmental effects, *i.e.*, the environmental effects that remain after mitigation has been applied. All mandatory factors under Section 16(1) of *CEAA* and additional factors for comprehensive studies under Section 16(2) of *CEAA* will be assessed for all phases of the Project (*i.e.*, Construction, Operation, and Decommissioning and Abandonment), as well as for Accidents, Malfunctions, and Unplanned Events. The evaluation will also consider the effects of the environment on the Project. For each VEC, a determination of significance will be made based on the identified significance criteria. If significant environmental effects are predicted, the assessment will include consideration of the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of present and those of the future.
- **Identification of Cumulative Environmental Effects.** Cumulative environmental effects of other projects and activities that overlap with those of the Project, for all phases of the Project (*i.e.*, Construction, Operation, and Decommissioning and Abandonment), as well as for Accidents, Malfunctions, and Unplanned Events, will be identified. An assessment of potential interactions will be completed to determine if an assessment of cumulative environmental effects is required (*i.e.*, there is potential for substantive interaction) for that specific Project-related environmental effect.
- **Evaluation of Cumulative Environmental Effects.** The residual cumulative environmental effects of the Project in combination with other past and future projects and activities that have been or will be carried out will be evaluated, including the contribution of the Project to those cumulative environmental effects.
- **Determination of Significance.** The significance of Project-related and residual cumulative environmental effects will be determined, in consideration of the significance criteria.
- **Recommendations for Follow-up.** The follow-up and monitoring required to verify the environmental effects predictions and assess the effectiveness of the planned mitigation will be recommended, where applicable.

Further details on the environmental assessment methodologies that will be used in this EIA/EA are provided in the sub-sections that follow.

5.2 Scoping of the Assessment

Issues identified through scoping (Chapter 4) will be analyzed and grouped into categories to assist in the selection of VECs. VECs are defined as broad components of the biophysical and human environments that, if altered by the Project, would be of concern to regulatory agencies, Aboriginal persons, resource managers, scientists, and/or the general public. These issues, along with the requirements of the Final Guidelines and EA Track Report, form the scope of the environmental assessment (*i.e.*, scope of Project, factors to be considered, and scope of factors to be considered).

As discussed in Chapter 4, the following VECs have been selected for this EIA/EA:

- Atmospheric Environment;
- Water Resources;
- Health and Safety;
- Freshwater Aquatic Environment;
- Terrestrial Environment;
- Wetland Environment;
- Marine Environment;
- Commercial Fisheries;
- Labour and Economy;
- Community Services and Infrastructure;
- Land Use;
- Current Use of Land Resources for Traditional Purposes by Aboriginal Persons;
- Heritage and Archaeological Resources;
- Land-Based Transportation; and
- Marine Vessel Traffic and Navigation.

In addition, the effects of the environment on the Project will be assessed. The environmental effects analysis for each VEC will be conducted in its own dedicated chapter of the EIA Report. However, accidents, malfunctions and unplanned events will be assessed for all VECs in a separate chapter (Chapter 23) on an event basis.

The scope of assessment with respect to each VEC is described in the following sub-sections.

5.2.1 Rationale for Selection of Valued Environmental Component, Regulatory Setting, and Consultation

The rationale for the selection of each VEC will first be described in its own dedicated environmental analysis section. The regulatory setting, ecological and socio-economic context of each VEC, and the influence of consultation or engagement on the assessment (as applicable) will also be described briefly.

5.2.2 Identification of Environmental Effects

The environmental effects for each VEC (and if applicable, key indicators) will be defined in consideration of the regulatory context for the VEC, issues identified through consultation or engagement, and existing conditions.

5.2.3 Selection of Measurable Parameters

For each VEC, one or more measurable parameters will be selected to facilitate the measurement of potential Project-related environmental effects and cumulative environmental effects. The degree of change in these measurable parameters will be used to characterize Project-related and cumulative environmental effects, and to evaluate the significance of the potential environmental effects.

5.2.4 Temporal Boundaries

The temporal boundaries for the assessment will be defined based on the timing and duration of Project activities and the nature of the interactions with each VEC. The purpose of a temporal boundary is to identify when an environmental effect may occur in relation to specific Project phases and activities. Temporal boundaries for the Project generally include the following Project phases:

- Construction;
- Operation; and
- Decommissioning and Abandonment.

In some cases, it will be necessary to further refine the temporal boundaries beyond simply limiting them to a specific phase of the Project. This will be carried out as necessary within each environmental effects analysis chapter. Temporal boundaries for the assessment may reflect seasonal variations or life cycle requirements of biological VECs or forecasted trends for socio-economic VECs.

5.2.5 Spatial Boundaries

Spatial boundaries will be established for the assessment of potential Project-related environmental effects and cumulative environmental effects for each VEC. The primary consideration used in the establishment of the boundaries of these assessment areas will be the probable geographical extent of the environmental effects (*i.e.*, the zone of influence) to the VEC.

Spatial boundaries represent the geographic extent of the VEC, as they pertain to potential Project-environment interactions. Spatial boundaries will be selected for each VEC to reflect the geographic extent over which Project activities will or are likely to occur, and as such, they may be different from one VEC to another depending on the characteristics of the VEC. Generally, the spatial boundaries will be referred to as the Assessment Area. The Assessment Area may be further sub-divided as the Project Development Area (PDA), the Local Assessment Area (LAA), and the Regional Assessment Area (RAA), as required.

- The PDA is the most basic and immediate area of the Project. The PDA typically is limited to the area of physical disturbance associated with the construction or operation of the Project. In the case of this EIA/EA, the PDA generally includes the area of disturbance associated with the Project. For those areas of disturbance on land, including the refinery and associated infrastructure, tank

facilities, linear facilities, marine terminal, and associated infrastructure, the term “refinery PDA” may be used. For those areas to be developed in the marine environment, including the marine terminal, jetty, barge landing facility, and other marine-based infrastructure, the term “marine PDA” may be used.

- The LAA is the maximum area within which Project-related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LAA includes the PDA and any adjacent areas where Project-related environmental effects may reasonably be expected to occur. In the case of this EIA/EA, the LAA generally includes east Saint John, the City of Saint John, or the Greater Saint John area, depending on the VEC.
- The RAA is the area within which cumulative environmental effects for the VEC may potentially occur. In this EIA/EA, the RAA generally includes the Greater Saint John area, Southern New Brunswick, or the Bay of Fundy, as applicable and appropriate depending on the VEC.

5.2.6 Administrative and Technical Boundaries

As appropriate, Administrative and Technical Boundaries will be identified and justified for each VEC. Administrative boundaries include specific aspects of provincial and federal regulatory requirements, standards, objectives, or guidelines, as well as regional planning initiatives that are relevant to the assessment of the Project’s environmental effects on the VEC.

Technical boundaries are the technical limitations for the evaluation of potential environmental effects of the Project, and may include limitations in scientific and social information, data analyses, and data interpretation.

5.2.7 Thresholds for Determining the Significance of Residual Environmental Effects

Threshold criteria or standards for determining the significance of environmental effects will be identified for each VEC, beyond which a residual environmental effect would be considered significant. These will be generally selected in consideration of provincial and federal regulatory requirements, standards, objectives, or guidelines that are applicable to the VEC, as developed in the Boundaries section.

In some cases, and particularly where standards, guidelines or regulatory requirements do not specifically exist, standards or thresholds will be defined for measurable parameters or environmental effects for a VEC. Thresholds will reflect the limits of an acceptable state for an environmental component based on resource management objectives, community standards, scientific literature, or ecological processes (*e.g.*, desired states for fish or wildlife habitats or populations), and in the absence of standards, will be suggested by the Study Team for consideration by the decision-making regulatory authorities.

5.3 Existing Conditions

The existing conditions for each VEC will then be described, including:

- The status and characteristics of the VEC within its defined spatial and temporal assessment boundaries;
- Information from past research conducted in the region;

- Traditional and ecological knowledge (if applicable); and
- Knowledge gained from the collection of baseline data through literature review, qualitative and quantitative analyses, and field programs carried out as part of the EIA/EA.

5.4 Project Interactions with the Environment

Interactions between all relevant Project activities and each VEC will be summarized in tabular format. Detailed information on the Project activities is provided in Chapter 3. Interactions will be ranked according to the potential for an activity to interact with each VEC, according to the following.

- If there is no interaction or no potential for substantive interaction between a Project activity and a VEC, an assessment of environmental effects will not be required. These interactions will be categorized as 0, and will not be considered further in the EIA/EA. The environmental effects of these activities will thus, by definition, be rated not significant.
- If a potential interaction between a Project activity and a VEC is identified, but not likely to be substantive in light of planned mitigation, the interactions will be categorized as 1. Such interactions are well understood and are subject to prescribed mitigation or codified practices. These interactions will be subject to a less detailed environmental effects assessment and rated not significant; however, justification will be provided for such categorizations and the proposed mitigation described. Such interactions can be mitigated with a high degree of certainty with proven technology and practices.
- If a potential interaction between a Project activity and a VEC is identified that may result in more substantive environmental effects despite the planned mitigation, or if there is less certainty regarding the effectiveness of mitigation, the interactions will be categorized as 2. These potential interactions will be subject to a more detailed analysis and consideration in the EIA/EA in order to predict, mitigate, and evaluate potential environmental effects.

Justification for assigning these ranks for each VEC will then be provided following the ranking. The Study Team will take a precautionary approach, whereby interactions with a meaningful degree of uncertainty will be assigned a rank of 2, ensuring that a detailed environmental effects assessment is conducted.

5.5 Environmental Effects Assessment

5.5.1 Assessment of Project-Related Environmental Effects

5.5.1.1 Description of Project-Related Environmental Effects

For each Project-related activity ranked as a 2, as discussed above, the assessment of each Project-related environmental effect will begin with a description of the mechanisms whereby specific Project activities and actions could result in the environmental effect. Where possible, the spatial and temporal extent of these changes (*i.e.*, where and when the environmental effect might occur) will also be described.

The EIA/EA will focus on residual environmental effects; environmental effects before mitigation are not quantified or characterized. The significance of the environmental effect before mitigation is not described or assessed.

5.5.1.2 Mitigation of Project Environmental Effects

Mitigation measures that will help reduce or eliminate an environmental effect will be described, with an emphasis on how these measures will help to reduce the environmental effect. Mitigation is defined as changes in the temporal or spatial aspects of the Project and/or the means in which the Project will be constructed, operated, or decommissioned or abandoned, over and above the Project design aspects described in Chapter 3. In addition, mitigation can include specialized measures such as habitat compensation, replacement, or financial compensation.

5.5.1.3 Characterization of Residual Project Environmental Effects

Residual environmental effects (*i.e.*, the environmental effects that remain after mitigation has been applied) will be described for a VEC during each Project phase, taking into account how the proposed mitigation would alter or change the environmental effect. The analysis will include both direct and indirect interactions between the Project and the VEC. The analysis will consider mitigation measures to reduce adverse environmental effects or to enhance positive environmental effects, as applicable and appropriate. Once mitigation measures are applied, any remaining environmental effect will be residual. Only residual environmental effects will be assessed for significance.

Environmental effects for each VEC will be characterized for each applicable Project phase and presented in an environmental effects summary table. The following criteria will be used to characterize potential residual environmental effects:

- **Direction** – the ultimate long-term trend of the environmental effect (*i.e.*, positive, neutral, or adverse);
- **Magnitude** – the amount of change in a measurable parameter or variable relative to existing (baseline) conditions;
- **Geographic Extent** – the area where an environmental effect of a defined magnitude occurs;
- **Frequency** – the number of times during the Project or a specific Project phase or activity that an environmental effect might occur (*e.g.*, one time or multiple times) in a specified time period;
- **Duration** – the period of time required until the VEC returns to its baseline condition or the environmental effect can no longer be measured or otherwise perceived (*e.g.*, short-term, mid-term, long-term, or in some cases permanent);
- **Reversibility** – the likelihood that a measurable parameter will recover from an environmental effect, including through active management techniques (*e.g.*, habitat restoration); and
- **Ecological or Socio-economic Context** – the general characteristics of the area in which the Project is located, as indicated by past and existing levels of human activity.

A key for each environmental effects summary table will provide summary criteria that will be modified as necessary for each VEC based on the specific boundaries (temporal, spatial, administrative, and technical) and significance criteria selected for each VEC. Where possible, these characteristics will be described quantitatively for each residual environmental effect. Where these characteristics cannot be expressed quantitatively, they will be described using qualitative terms that were defined specifically for the VEC or environmental effect.

Following the rating, residual environmental effects will be described and discussed for the VEC during each Project phase, taking into account how the proposed mitigation will alter or change the environmental effect.

5.5.2 Assessment of Cumulative Environmental Effects

5.5.2.1 Screening for Cumulative Environmental Effects

After completing the assessment of potential Project-related environmental effects on the VEC, where residual environmental effects are identified, a cumulative environmental effects assessment will be conducted for those Project-related environmental effects that may overlap with other projects and activities that have been or will be carried out.

The screening for cumulative environmental effects will be conducted to determine if there is potential for a cumulative environmental effect. A series of three questions is used to screen cumulative environmental effects:

- Is there a Project-related environmental effect;
- Does the Project-related environmental effect overlap with those of other past, present and future projects and activities that have been or will be carried out; and
- Is the Project contribution to cumulative environmental effects substantive and measurable or discernible such that there is some potential for substantive cumulative environmental effects that are attributable to the Project?

If, based on these three questions, there is potential for cumulative environmental effects, it will be assessed to determine if it has the potential to shift a component of the natural or human environment to an unacceptable state.

Residual environmental effects for each VEC will be reviewed for potential spatial and temporal overlap with similar environmental effects of other projects and activities. Only projects and activities that overlap with the Project residual environmental effects both spatially and temporally will be included in the assessment of potential cumulative environmental effects.

5.5.2.2 Identification of Other Projects and Activities

Other projects and activities that have been or will be carried out will be identified for inclusion in the cumulative environmental effects assessment, based on their potential for residual environmental effects that could overlap spatially and temporally with the residual environmental effects of the Project. The environmental effects of other past and present projects or activities are generally reflected in the existing baseline environment and will therefore be considered in the Project-related environmental effects assessment for each VEC. The assessment and evaluation of the cumulative environmental effects of the Project in combination with other projects and activities that will be carried out will consider the nature and degree of change from these baseline environmental conditions in combination with the Project.

The screening of other projects and activities relevant to the cumulative environmental effects assessment is generally based on the criteria described in Table 5.1. The specific list of other projects

and activities identified for inclusion in the cumulative environmental effects assessment for this EIA/EA will be described in Section 6.4.

Table 5.1 Criteria for Identification of Other Projects and Activities That Have Been or Will Be Carried Out, for the Cumulative Environmental Effects Assessment

Criteria	Rationale and Application
<p><u>Status of other project or activity:</u> Past or present project, or a project or activity that is certain, planned, or reasonably foreseeable.</p>	<p>The environmental effects of past and present projects and activities are evaluated in the assessment of environmental effects of the Project. With some exceptions, the cumulative environmental effects assessment does not specifically consider past and present projects and activities because the environmental effects resulting from past and present projects and activities are captured in the description of baseline conditions. The exceptions are recently initiated projects and activities (e.g., Canaport LNG) where the environmental effects are recent and may not be fully reflected in the baseline conditions, or projects/activities that will probably change in scope in the foreseeable future.</p> <p>Certain/planned projects or activities are those that have a high probability of being implemented, and include the following projects proximal to the Project:</p> <ul style="list-style-type: none"> ▪ Those that are currently registered under the New Brunswick <i>Environmental Impact Assessment Regulation</i> (under review), and are listed on the NBENV website; ▪ Those currently undergoing an EA under <i>CEAA</i>, and are listed on the Canadian Environmental Assessment Registry website; and ▪ Those that have been publicly announced as being under serious consideration by proponents but have not yet registered, or that will be registered in the near future. <p>Reasonably foreseeable projects and activities are highly likely to be implemented and include those identified in approved development plans or those that are in advanced stages of planning.</p> <p>Hypothetical and speculative projects and activities are not considered as part of the cumulative environmental effects assessment.</p>
<p><u>Potential for overlap related to timing of the project and/or activity:</u> Other project or activity must be carried out or implemented during the time frame that is relevant to the Project.</p>	<p>The Project involves the following timeframes.</p> <ul style="list-style-type: none"> ▪ Construction: Construction in two sequential phases spanning a period of six to eight years, commencing in 2010. ▪ Operation: Phase 1 of the Project commencing commercial operation in 2015, and Phase 2 of the Project commencing operation in the 2018-2020 time period. The combined operation of both phases of the Project would be anticipated to continue for approximately 30 years. The implementation of a proactive and effective maintenance and reliability program could result in the facility being operational for a longer period of time. <p>The timeframe for other projects and activities relevant to the cumulative environmental effects assessment must overlap with these periods for the Project, in that they will extend through Construction and/or Operation.</p>
<p><u>Potential for a spatial overlap of environmental effect:</u> Other project or activity must be located within the RAA as defined in the environmental effects analysis for each VEC.</p>	<p>Projects with an identified or expected zone of influence that may overlap with the geographic area likely to be affected by the Project (including VEC spatial boundaries) are of interest.</p>

Where a cumulative environmental effects assessment is completed for a VEC, only those projects and activities that could result in an overlapping environmental effect are included in the cumulative environmental effects assessment. The specific projects and activities and actions considered for each environmental effect will be outlined in the assessment for the VEC.

5.5.2.3 Description of Cumulative Environmental Effects

The assessment of each cumulative environmental effect will begin with a description of the environmental effect and the mechanisms whereby the Project environmental effects may interact with other projects and activities in the RAA. Where possible, the cumulative environmental effect will be quantified in terms of the degree of change in the appropriate measurable parameter(s) and the spatial and temporal extent of these changes (*i.e.*, where and when the interactions between the Project's residual environmental effects and the residual environmental effects of other projects and activities might occur).

As the assessment focuses on residual environmental effects, cumulative environmental effects before mitigation are not characterized. The significance of the environmental effect before mitigation will not be described.

5.5.2.4 Use of Temporal Cases

Where several environmental effects are evaluated in a particular VEC, or where the screening of cumulative environmental effects identifies that a detailed evaluation of these cumulative environmental effects is required, temporal cases will be defined where appropriate and helpful to assist in the assessment of cumulative environmental effects. Where this occurs, cumulative environmental effects will generally be described for three cases, as follows.

- **Base Case** – describes the current status of the measurable parameter(s) for the environmental effect prior to the start of the Project, including all appropriate past and present projects and activities. Present projects and activities include all projects or actions that currently exist, as well as projects that have been approved under some form of regulatory permitting. The Base Case will normally be presented in the existing conditions of the VEC, with explicit reference to the fact that the Base Case reflects the contributions of past and present projects and activities.
- **Project Case** – describes the status of the measurable parameter(s) for the environmental effect with the Project in place, over and above the Base Case. This will usually be assessed using the peak environmental effect of the Project or the maximum active footprint for the Project.
- **Future Case** – describes the status of the measurable parameter(s) for the environmental effect as a result of the Project Case in combination with all reasonably foreseeable projects and activities. Reasonably foreseeable projects are defined as future projects and activities that will occur with certainty, including projects that are in some form of regulatory approval process or where a public announcement to seek regulatory approval has been made (*i.e.*, they are likely to occur).

Although this methodology will not be applied universally to every VEC, the comparison of the Project Case with the Future Case allows the Project contribution to cumulative environmental effects of all past, present, and reasonably foreseeable projects and activities (*i.e.*, Future Case) to be determined.

5.5.2.5 Mitigation of Residual Cumulative Environmental Effects

As with Project-related environmental effects, mitigation measures that would reduce the cumulative environmental effects will be described, with an emphasis on those measures that would help to minimize the interaction of the Project-related environmental effect with similar environmental effects from other projects, activities, and actions. Three types of mitigation measures will generally be considered, as applicable:

- Measures that can be implemented solely by the Proponent;
- Measures that can be implemented by the Proponent in cooperation with other project proponents, government, Aboriginal organizations, the public, and/or other stakeholders; and
- Measures that can be implemented independently by other project proponents, government, Aboriginal organizations, the public, and/or other stakeholders.

5.5.3 Characterization of Residual Cumulative Environmental Effects

Residual cumulative environmental effects will be described and assessed, taking into account how the proposed mitigation will alter or change the cumulative environmental effect. As described for Project-related environmental effects (Section 5.5.1), cumulative environmental effects will be characterized where applicable and appropriate in terms of the direction, magnitude, geographic extent, frequency, duration, reversibility, and ecological or socio-economic context. The contribution of the Project to cumulative environmental effects will be assessed where there will be a potential for substantive overlapping environmental effects to occur.

5.6 Determination of the Significance of Residual Environmental Effects

5.6.1 Determination of Significance of Project-Related Residual Environmental Effects

A determination of the significance of Project environmental effects will be made using standards or thresholds of significance defined for the VEC and/or the measurable parameters (Section 5.2.7), beyond which a residual environmental effect would be considered significant. The determination of significance may be made along with the assessment of Project-related environmental effects, or in a separate Determination of Significance section.

Where the environmental effects are determined to be significant, the determination will include consideration of the level of confidence in the prediction based on the following criteria:

- Scientific certainty (professional judgment) of the rating, in consideration of the Technical Boundaries; and
- Likelihood of the environmental effect occurring.

If significant residual environmental effects that are likely to occur are predicted, the assessment will include consideration of the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of present and those of the future.

5.6.2 Determination of Significance of Residual Cumulative Environmental Effects

A determination of the significance of residual adverse cumulative environmental effects will then be made using the same standards or thresholds for significance developed for the VEC and/or the measurable parameters. As with residual Project-related environmental effects, the determination of residual cumulative environmental effects will include a discussion of the level of confidence in the prediction (Section 5.6.1). The determination of significance may be made along with the assessment of cumulative environmental effects, or separately in the Determination of Significance section.

5.7 Follow-up and Monitoring

Follow-up programs are used, where applicable, to verify environmental effects predictions and effectiveness of mitigation measures. Monitoring programs are compliance programs used to verify that mitigation was applied. Appropriate follow-up and/or monitoring programs are proposed where a need has been identified or where the scientific certainty of the environmental effects predictions or the effectiveness of mitigation warrants the need for such programs.

5.8 Potential Accidents, Malfunctions and Unplanned Events

Accidents, Malfunctions and Unplanned Events will be assessed for the Project in Chapter 23. Potential accidents, malfunctions, and unplanned events will be identified based on the Project Description using historical performance data for other similar projects at a regional, provincial, national or international scale, as appropriate. Where applicable, for each accident, malfunction, or unplanned event, one or more scenarios relating to how the accident, malfunction, or unplanned event might occur during the life of the Project will be developed. The focus of the evaluation will be on credible accidents, malfunctions, and unplanned events that have a reasonable likelihood of occurring during the lifetime of the Project based on the nature of the Project and the environmental effects that may occur, or for those that could result in significant environmental effects even if their likelihood of occurrence is low. Details on the types of accidents, malfunctions and unplanned events considered in this EIA/EA are provided in Chapter 23.

For each event and/or scenario, a preliminary screening will be conducted to determine if the event and/or scenario is likely to affect the VEC. Potential interactions will be ranked using the same criteria as for Project interactions with the environment (Section 5.4).

For interactions that are ranked as 2, potential environmental effects of the event and/or scenario on the VEC are assessed. Environmental effects are characterized using the same terms as routine Project-related environmental effects (Section 5.5.1).

Cumulative environmental effects of accidents, malfunctions, or unplanned events, however, will not be assessed as it is not reasonably foreseeable to have overlapping Project-related accidents with those from other projects and activities that will be carried out.

The significance of the Project-related environmental effects for each accident, malfunction, or unplanned event and its likelihood of occurrence will then be determined using the same thresholds as determined for the Project-related environmental effects on each applicable VEC.

