



Canadian Environmental
Assessment Agency

Agence canadienne
d'évaluation environnementale

DRAFT GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

pursuant to the

Canadian Environmental Assessment Act, 2012

PACIFIC FUTURE ENERGY REFINERY PROJECT

Proposed by

PACIFIC FUTURE ENERGY CORPORATION

October 7, 2016

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DISCLAIMER

This document is not a legal authority, nor does it provide legal advice or direction; it provides information only, and must not be used as a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) or its regulations. In the event of a discrepancy, CEAA 2012 and its regulations prevail. Portions of CEAA 2012 have been paraphrased in this document, but will not be relied upon for legal purposes.

Abbreviations and Short Forms

CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
Agency	Canadian Environmental Assessment Agency
EA	environmental assessment
EIS	environmental impact statement
VC	valued component

Part 1 - Key Considerations

1. INTRODUCTION

The purpose of this document is to identify for Pacific Future Energy Corporation (the proponent) the minimum information requirements for the preparation of an Environmental Impact Statement (EIS) for the Pacific Future Energy Refinery Project, a designated project¹ to be assessed pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). This document specifies the nature, scope and extent of the information required. Part 1 of this document defines the scope of the environmental assessment (EA) and provides guidance and general instruction that must be taken into account in preparing the EIS. Part 2 outlines the information that must be included in the EIS.

Section 5 of CEAA 2012 describes the environmental effects that must be considered in an EA, including changes to the environment and effects of changes to the environment. The factors that are to be considered in an EA are described under section 19 of CEAA 2012. The Canadian Environmental Assessment Agency (the Agency) or a review panel will use the proponent's EIS and other information received during the EA process to prepare a report that will inform the issuance of a decision statement by the Minister of Environment and Climate Change. Therefore the EIS must include a full description of the changes the project will cause to the environment that may result in adverse effects on areas of federal jurisdiction (i.e. section 5 of CEAA 2012) including changes that are directly linked or necessarily incidental to any federal decisions that would permit the project to be carried out. The EIS must also include a list of key mitigation measures that the proponent proposes to undertake in order to avoid or minimize any adverse environmental effects of the project. It is the responsibility of the proponent to provide sufficient data and analysis on potential changes to the environment to ensure a thorough evaluation of the environmental effects of the project by the Agency or review panel.

2. GUIDING PRINCIPLES

2.1. Environmental assessment as a planning and decision making tool

Environmental assessment (EA) is a process to predict environmental effects of proposed initiatives before they are carried out. An EA:

- identifies potential adverse environmental effects;
- proposes measures to mitigate adverse environmental effects;
- predicts whether there will be significant adverse environmental effects, after mitigation measures are implemented; and
- includes a follow-up program to verify the accuracy of the EA and the effectiveness of the mitigation measures.

2.2. Public participation

¹ In this document, “project” has the same meaning as “designated project” as defined in the CEAA 2012.

One of the purposes identified in CEEA 2012 is to ensure that opportunities are provided for meaningful public participation during an EA. CEEA 2012 requires that the Agency provide the public with an opportunity to participate in the EA. For EAs led by the Agency the public has an opportunity to comment on the draft EA report. For EAs by a review panel, CEEA 2012 requires that the review panel hold a public hearing. Additional opportunities for participation may also be provided.

Meaningful public participation is best achieved when all parties have a clear understanding of the proposed project as early as possible in the review process. The proponent is required to provide current information about the project to the public and especially to the communities likely to be most affected by the project.

2.3. Aboriginal engagement

A key objective of CEEA 2012 is to promote communication and cooperation with Aboriginal peoples which includes First Nations, Inuit and Métis. The proponent is expected to engage with Aboriginal groups that may be affected by the project, beginning as early as possible in the project planning process. The proponent shall provide potentially affected Aboriginal groups with opportunities to learn about the project and its potential effects and to make their concerns known about the project's potential effects and discuss measures to mitigate those effects. The proponent is strongly encouraged to work with potentially affected Aboriginal groups in establishing an engagement approach. The proponent will integrate Aboriginal traditional knowledge into the assessment of environmental impacts where possible. For more information on incorporating Aboriginal traditional knowledge, refer to Part 1, section 4.2.2 of these Guidelines.

In order to fulfill the Crown's constitutional obligations to consult with potentially impacted Aboriginal groups, the Agency integrates its legal obligation for consultation and accommodation in the EA process. The information gathered by the proponent during its engagement with Aboriginal groups helps to contribute to the Crown's understanding of any potential adverse impacts of the project on potential or established Aboriginal or treaty rights protected under section 35 of the *Constitution Act*, (1982)² ("section 35 Aboriginal rights") including title and related interests, and the effectiveness of measures proposed to avoid or minimize those impacts.

2.4. Application of the precautionary approach

In documenting the analyses included in the EIS, the proponent will demonstrate that all aspects of the project have been examined and planned in a careful and precautionary manner in order to avoid significant adverse environmental effects.

² Section 35 of *Constitution Act, 1982* extracted as follows:

- (1) The existing aboriginal and treaty rights of the aboriginal peoples of Canada are hereby recognized and affirmed.
- (2) In this Act, aboriginal peoples of Canada includes the Indian, Inuit and Métis peoples of Canada.
- (3) For greater certainty, in subsection (1) "treaty rights" includes rights that now exist by way of land claims agreements or may be so acquired.
- (4) Notwithstanding any other provision of this Act, the aboriginal and treaty rights referred to in subsection (1) are guaranteed equally to male and female persons.

3. SCOPE OF THE ENVIRONMENTAL ASSESSMENT³

3.1. Designated Project

On June 7, 2016 Pacific Future Energy Corporation, the proponent of the Pacific Future Energy Refinery Project provided a project description to the Agency. Based on this project description, the Agency has determined that an EA is required under CEAA 2012 and will include the construction, operation, decommissioning and abandonment of the following project components:

- An oil refinery capable of processing bitumen at a rate of 31 795 cubic metres per day;
- Storage for petroleum products with a capacity of 500 000 cubic metres;
- Water withdrawal infrastructure capable of drawing 48 000 cubic metres per day (17 000 000 cubic metres per year) from either groundwater sources or the Kitimat River;
- A 6 inch diameter, 40 kilometre long pipeline for discharging process water, that runs from the Project site to Douglas Channel;
- A railyard with 7 tracks that are a combined 20.9 kilometres in length;
- A railroad connection to the nearby existing CN Rail line;
- Electrical infrastructure capable of generating 300 megawatts;
- Tie-in to a nearby existing natural gas pipeline;
- Marine transportation of prefabricated refinery modules arriving from Asia;
- Use of existing marine terminal infrastructure in Kitimat to off-load refinery modules;
- A new 50 metres wide, 40 kilometres long access road to transport the refinery modules from Kitimat to the Project site;
- Upgrades to existing access roads;
- Ancillary facilities (control rooms, administration and maintenance offices); and
- Workforce housing accommodations.

3.2. Factors to be considered

Scoping establishes the parameters of the EA and focuses the assessment on relevant issues and concerns. Part 2 of this document specifies the factors to be considered in this EA, including the factors listed in subsection 19(1) of CEAA 2012:

- environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other physical activities that have been or will be carried out;
- the significance of the effects referred to above;
- comments from the public;

³ Section 19(2) of CEAA 2012 indicates that the Minister of Environment and Climate Change shall set the scope of the factors to be considered for environmental assessments by review panel. In addition to the information contained in the EIS Guidelines, the Minister may provide additional direction in the Terms of Reference for the Review Panel.

- mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;
- the requirements of the follow-up program in respect of the project;
- the purpose of the project;
- alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;
- any change to the project that may be caused by the environment; and
- the results of any relevant regional study pursuant to CEAA 2012.

Under the authority of paragraph 19(1)(j) of CEAA 2012, the Agency also requires consideration of the following additional factors⁴:

- an estimate of upstream greenhouse gas emissions that are linked to the project. This information should be presented by individual pollutant and should be summarized in CO₂ equivalent units per year; and
- the environmental effects of any incidental activities associated with the Project, such as receiving raw product and transporting all final and by-products from the refinery, including the environmental effects of malfunctions or accidents and any cumulative environmental effects, the significance of those effects, suggested mitigation measures and follow-up program requirements.

3.2.1. Changes to the Environment

Environmental effects occur as interactions between actions (the carrying out of the project or decisions made by the federal government in relation to the project) and receptors in the environment, and subsequently between components of the environment (e.g., change in water quality that may affect fish).

Under CEAA 2012, an examination of environmental effects that result from changes to the environment as a result of the project being carried out or as a result of the federal government exercising any power duty or function that would allow the project to be carried out must be considered in the EIS.

In scoping the potential changes to the environment that may occur, the proponent should consider any potential changes in the physical environment such as changes to air quality, water quality and quantity, and physical disturbance of land that could reasonably be expected to occur.

3.2.2. Valued components to be examined

Valued components (VCs) refer to environmental biophysical or human features that may be impacted by a project. The value of a component not only relates to its role in the ecosystem, but also to the value people place on it. For example, it may have been identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

⁴ Should the environmental assessment of the project be referred to a review panel, any additional factors to be considered that the Minister of Environment and Climate Change requires to be taken into account will be included in the Terms of Reference for the Review Panel.

The proponent must conduct and focus its analysis on VCs as they relate to **section 5 of CEEA 2012**, including the ones identified in Part 2 (section 6.2) that may be affected by changes in the environment, as well as species at risk and their critical habitat as per the requirement outlined in section 79 of the *Species at Risk Act*. Section 5 of CEEA 2012 defines environmental effects as:

- A change that may be caused to fish and fish habitat, marine plants and migratory birds;
- A change that may be caused to the environment on federal lands, in another province or outside Canada;
- With respect to aboriginal peoples, an effect of any change that may be caused to the environment on:
 - health and socio-economic conditions;
 - physical and cultural heritage;
 - the current use of lands and resources for traditional purposes; or
 - any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.
- For projects requiring a federal authority to exercise a power or perform a duty or function under another Act of Parliament:
 - a change, other than the ones mentioned above, that may be caused to the environment and that is directly linked or necessarily incidental to the exercise of the federal power, duty or function; and
 - the effect of that change, other than the ones mentioned above, on:
 - health and socio-economic conditions;
 - physical and cultural heritage; and
 - any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

The list of VCs to be presented in the EIS will be completed according to the evolution and design of the project and reflect the knowledge acquired through public consultation and engagement with Indigenous groups. The EIS will describe what methods were used to predict and assess the adverse environmental effects of the project on these components.

The VCs will be described in sufficient detail to allow the reviewer to understand their importance and to assess the potential for environmental effects arising from the project's activities. The EIS will provide a rationale for selecting specific VCs and for excluding any VCs or information specified in these Guidelines. Challenges may arise regarding particular exclusions, so the EIS must document the information and the criteria used to justify the exclusion of a particular VC or piece of information. Justification may be based on, for example, primary data collection, computer modelling, literature references, public participation or engagement with Indigenous groups, expert input or professional judgement. The EIS will identify those VCs, processes, and interactions that either were identified to be of concern during any meetings held by the proponent or that the proponent considers likely to be affected by the project. In doing so, the EIS will indicate to whom these concerns are important (i.e. the public or Indigenous groups) and the reasons why, including environmental, Aboriginal, cultural, historical, social, economic, recreational, and aesthetic considerations. If comments are received on a component that has not been included as a VC, these comments will be summarised and the rationale for excluding the VC will address the comments.

3.2.3. Spatial and Temporal boundaries

The spatial and temporal boundaries used in the EA may vary depending on the VC and will be considered separately for each VC, including for VCs related to the current use of lands and resources for traditional purposes by Aboriginal peoples, or other environmental effects referred to under paragraph 5(1)(c) of CEAA 2012. The proponent is encouraged to consult with the Agency, federal and provincial government departments and agencies, local government and Indigenous groups, and take into account public comments when defining the spatial and temporal boundaries used in the EIS.

The EIS will describe the spatial boundaries, including local and regional study areas, of each VC to be used in assessing the potential adverse environmental effects of the project and provide a rationale for each boundary. Spatial boundaries will be defined taking into account the appropriate scale and spatial extent of potential environmental effects, community knowledge and Aboriginal traditional knowledge, current land and resource use by Indigenous groups, ecological, technical, social and cultural considerations.

The temporal boundaries of the EA will span all phases of the project determined to be within the scope of this EA as specified under section 3.1 above. If impacts are predicted after project decommissioning, this must be taken into consideration in defining boundaries. Community knowledge and Aboriginal traditional knowledge must factor into decisions around defining temporal boundaries.

If the temporal boundaries do not span all phases of the project, the EIS will identify the boundaries used and provide a rationale.

4. PREPARATION AND PRESENTATION OF THE ENVIRONMENTAL IMPACT STATEMENT

4.1. Guidance

The proponent is encouraged to consult relevant Agency policy and guidance⁵ on topics to be addressed in the EIS, and to liaise with the Agency during the planning and development of the EIS. The proponent is also encouraged to consult relevant guidance from other federal departments.

In planning for an oil refinery proposal and in developing the EIS and technical support documentation, the proponent is advised to consider Information Gathering Notices under subsection 46 of the *Canadian Environmental Protection Act*. The proponent should consider any applicable regulations regarding diesel, gasoline and renewable fuels, regulations concerning sulphur and benzene in fuels, regulations concerning contaminated fuels, and any other regulations regarding the release of volatile organic compounds or air pollutant regulations. Codes of practice from the Canadian Council of Minister of the Environment should also be considered during the development of the EIS where applicable.

Submission of regulatory and technical information necessary for federal authorities to make their regulatory decisions during the conduct of the EA is at the discretion of the proponent. Although that information may not be necessary for the EA decision, the proponent is encouraged to submit it concurrent with the EIS. While the EIS must outline applicable federal authorizations required for the

⁵ Visit the Canadian Environmental Assessment Agency website: www.ceaa-acee.gc.ca/default.asp?lang=En&n=F1F30EEF-1

project to proceed, the proponent must provide information relevant to the regulatory role of the federal government. It should be noted that the issuance of these other applicable federal legislative, regulatory and constitutional requirements are within the purview of separate relevant federal authorities, and are subject to separate processes post EA decision.

4.2. Use of information

4.2.1. Government expert advice

Section 20 of CEAA 2012 requires that every federal authority with specialist or expert information or knowledge with respect to a project subject to an EA make that information or knowledge available to the Agency or review panel. The Agency will advise the proponent of the availability of pertinent information or knowledge or expert and specialist knowledge received from other federal authorities or other levels of government so that it can be incorporated into the EIS.

4.2.2. Community knowledge and Aboriginal traditional knowledge

Sub-section 19(3) of CEAA 2012 states that “the environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge”. For the purposes of these Guidelines, community knowledge and Aboriginal traditional knowledge refers to knowledge acquired and accumulated by a local community or an Aboriginal community.

The proponent will incorporate into the EIS the community knowledge and Aboriginal traditional knowledge to which it has access or that is acquired through public participation and engagement with Indigenous groups, in keeping with appropriate ethical standards and obligations of confidentiality. The proponent will integrate Aboriginal traditional knowledge into all aspects of its assessment including both methodology (e.g., establishing spatial and temporal boundaries, defining significance criteria) and analysis (e.g., baseline characterization, effects prediction, development of mitigation measures). Agreement should be obtained from Indigenous groups regarding the use, management and protection of their traditional knowledge during and after the EA. For more information on how Aboriginal traditional knowledge can be obtained and incorporated in the preparation of the EIS, please refer to the Agency’s reference guide entitled “*Considering Aboriginal traditional knowledge in environmental assessments conducted under the Canadian Environmental Assessment Act, 2012*”.

4.2.3. Existing information

In preparing the EIS, the proponent is encouraged to make use of existing information relevant to the project. When relying on existing information to meet requirements of the EIS Guidelines, the proponent will either include the information directly in the EIS or clearly direct the reader to where it may obtain the information (i.e., through cross-referencing). When relying on existing information, the proponent will also comment on how the data were applied to the project, separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from the existing information.

4.2.4. Confidential information

In implementing CEAA 2012, the Agency is committed to promoting public participation in the EA of projects and providing access to the information on which EAs are based. All documents prepared or submitted by the proponent or any other stakeholder in relation to the EA are included in the Canadian

Environmental Assessment Registry and made available to the public on request, except where non-disclosure is deemed necessary by a review panel, should the EA of that Project be referred to a review panel. For this reason, the EIS will not contain information that:

- is sensitive or confidential (i.e., financial, commercial, scientific, technical, personal, cultural or other nature), that is treated consistently as confidential, and the person affected has not consented to the disclosure; or,
- may cause harm to a person or harm to the environment through its disclosure.

The proponent will consult with the Agency regarding whether specific information requested by these guidelines should be treated as confidential.

4.3. Study strategy and methodology

The proponent is expected to respect the intent of these Guidelines and to consider the effects that are likely to arise from the project (including situations not explicitly identified in these Guidelines), the technically and economically feasible mitigation measures that will be applied, and the significance of all residual effects. Except where specified by the Agency, the proponent has the discretion to select the most appropriate methods to compile and present data, information and analysis in the EIS as long as they are justifiable and replicable.

It is possible these Guidelines may include matters which, in the judgement of the proponent, are not relevant or significant to the project. If such matters are omitted from the EIS, the proponent will clearly indicate what was omitted, and provide a justification so the Agency, review panel if applicable, federal authorities, Aboriginal groups, the public and any other interested party have an opportunity to comment on this decision. Where the Agency or review panel disagrees with the proponent's decision, it will require the proponent to provide the specified information.

The assessment will include the following general steps:

- ✓ identify the activities and components of the project;
- ✓ predict potential changes to the environment
- ✓ predict and evaluating the likely effects on identified VCs;
- ✓ identify technically and economically feasible mitigation measures for any significant adverse environmental effects;
- ✓ determine any residual environmental effects after mitigation measures are implemented;
- ✓ determine the cumulative effects of the project in combination with other physical activities; and
- ✓ determine the significance of all residual environmental effects following the implementation of mitigation measures.

For each VC, the EIS will describe the methodology used to assess project-related effects. The EIS will include an analysis of the pathway of the effects of environmental changes on each VC. The EIS will document how scientific, engineering, community knowledge and Aboriginal traditional knowledge were used to reach conclusions. Assumptions will be clearly identified and justified. All data, models and studies will be documented such that the analyses are transparent and reproducible. All data collection methods will be specified. The uncertainty, reliability, sensitivity and conservativeness of models used to reach conclusions must be indicated.

The EIS will identify the gaps in knowledge and understanding related to key conclusions, and the steps to be taken by the proponent to address these gaps. Where the conclusions drawn from scientific, engineering and technical knowledge are inconsistent with the conclusions drawn from Aboriginal traditional knowledge, the EIS will present each perspective on the issue and a statement of the proponent's conclusions.

The EIS will include a description of the environment (both biophysical and human), including the components of the existing environment and environmental processes, their interrelations as well as the variability in these components, processes and interactions over time scales appropriate to the likely effects of the project. The description will be sufficiently detailed to characterize the environment before any disturbance to the environment due to the project including exploratory work, and to identify, assess and determine the significance of the potential adverse environmental effects of the project. This data should include results from studies done prior to any physical disruption of the environment due to initial site clearing activities. The information describing the existing environment should be provided in a stand-alone chapter of the EIS, however some elements may be integrated into clearly defined sections within the effects assessment of each VC if appropriate. This analysis will include environmental conditions resulting from historical and present activities in the local and regional study areas.

If the baseline data have been extrapolated or otherwise manipulated to depict environmental conditions in the study areas, the modelling methods and equations will be described and will include calculations of margins of error and other relevant statistical information, such as confidence intervals and possible sources of error. The proponent will provide the references used in creating their approach to baseline data gathering, including identifying where appropriate, the relevant federal or provincial standards. The proponent is encouraged to discuss the timeframe and considerations for its proposed baseline data with the Agency prior to submitting its EIS.

In describing and assessing effects to the physical and biological environment, the proponent will take an ecosystem approach that considers both scientific and community knowledge and Aboriginal traditional knowledge and perspectives regarding ecosystem health and integrity. The proponent will consider the resilience of relevant species populations, communities and their habitats. The assessment of environmental effects on Aboriginal peoples, pursuant to paragraph 5(1)(c) of CEEA 2012, will undergo the same rigour and type of assessment as any other VC (including setting of spatial and temporal boundaries, identification and analysis of effects, identification of mitigation measures, determination of residual effects, identification and a clear explanation of the methodology used for assessing the significance of residual effects and assessment of cumulative effects). The proponent will consider the use of both primary and secondary sources of information regarding baseline information, changes to the environment and the corresponding effect on health, socio-economics, physical and cultural heritage and the current use of lands and resources for traditional purposes. Primary sources of information include traditional land use studies, socio-economic studies, heritage surveys or other relevant studies conducted specifically for the project and its EIS. Often these studies and other types of relevant information are obtained directly from Indigenous groups. Secondary sources of information include previously documented information on the area, not collected specifically for the purposes of the project, or desk-top or literature-based information. The proponent will provide Aboriginal groups the opportunity to review and provide comments on the information used for describing and assessing effects on Aboriginal peoples (further information on engaging with Aboriginal groups is provided in Part 2, Section 5 of this document). Where there are discrepancies in the views of the proponent and Indigenous groups on the information to be used in

the EIS, the EIS will document these discrepancies and the rationale for the proponent's selection of information.

The assessment of the effects of each of the project components and physical activities, in all phases, will be based on a comparison of the biophysical and human environments between the predicted future conditions with the project and the predicted future conditions without the project. In undertaking the environmental effects assessment, the proponent will use best available information and methods. All conclusions must be substantiated. Predictions will be based on clearly stated assumptions. The proponent will describe how each assumption has been tested. With respect to quantitative models and predictions, the EIS will document the assumptions that underlie the model, the quality of the data and the degree of certainty of the predictions obtained.

4.4. Presentation and organization of the Environmental Impact Statement

To facilitate the identification of the documents submitted and their placement in the Canadian Environmental Assessment Registry, the title page of the EIS and its related documents will contain the following information:

- Project name and location;
- title of the document, including the term “environmental impact statement”;
- subtitle of the document;
- name of the proponent; and
- the date of submission of the EIS.

The EIS will be written in clear, precise language. A glossary defining technical words, acronyms and abbreviations will be included. The EIS will include charts, diagrams, tables, maps and photographs, where appropriate, to clarify the text. Perspective drawings that clearly convey the various components of the project will also be provided. Wherever possible, maps will be presented in common scales and datum to allow for comparison and overlay of mapped features.

For purposes of brevity and to avoid repetition, cross-referencing is preferred. The EIS may make reference to the information that has already been presented in other sections of the document, rather than repeating it. Detailed studies (including all relevant and supporting data and methodologies) will be provided in separate appendices and will be referenced by appendix, section and page in the text of the main document. The EIS will explain how information is organized in the document. This will include a list of all tables, figures, and photographs referenced in the text. A complete list of supporting literature and references will also be provided. A table of concordance, which cross references the information presented in the EIS to the subsection and page number with the information requirements identified in the EIS Guidelines, will be provided. The proponent will provide copies of the EIS and its summary for distribution, including paper and electronic version in an unlocked, searchable PDF format, as directed by the Agency.

4.5. Summary of the Environmental Impact Statement

The proponent will prepare a summary of the EIS in both of Canada's official languages (French and English) to be provided to the Agency at the same time as the EIS and which will include the following:

- a concise description of all key components of the project and related activities;

- a summary of the engagement with Indigenous groups, the public, and government agencies, including a summary of the issues raised and the proponent's responses;
- an overview of expected changes to the environment;
- an overview of the key environmental effects of the project as described under section 5 of CEAA 2012 and proposed technically and economically feasible mitigation measures;
- an overview of how factors under section 19 of CEAA 2012 were considered;
- the proponent's conclusions on the residual environmental effects of the project after taking mitigation measures into account and the significance of those effects; and
- an overview of the proposed follow-up and monitoring required to verify the predictions of the assessment and the effectiveness of the mitigation measures.

The summary is to be provided as a separate document and should be structured as follows:

1. Introduction and EA context
2. Project overview
3. Alternative means of carrying out the project
4. Public participation
5. Engagement with Indigenous Groups
6. Summary of environmental effects assessment for each VCs, including:
 - a. description of the baseline;
 - b. anticipated changes to the environment
 - c. anticipated effects
 - d. mitigation measures
 - e. conclusions and significance of residual effects
7. Follow-up and monitoring programs proposed

The summary will have sufficient details for the reader to learn and understand the project, potential environmental effects, proposed mitigation measures, and the significance of the residual effects. The summary will include key maps illustrating the project location and key project components.

Part 2 – Content of the Environmental Impact Statement

1. INTRODUCTION AND OVERVIEW

1.1. The proponent

In the EIS, the proponent will:

- provide contact information (e.g. name, address, phone, fax, email) of company representative(s);
- identify itself and the name of the legal entity(ies) that would develop, manage and operate the project;
- describe corporate and management structures;
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the project;
- identify key personnel, contractors, and/or sub-contractors responsible for preparing the EIS.

1.2. Project Overview

The EIS will describe the project, key project components and associated activities, scheduling details, the timing of each phase of the project and other key features. If the project is a part of a larger sequence of projects, the EIS will outline the larger context.

The overview is to identify the key components of the project, rather than providing a detailed description, which will follow in Section 3 of this document.

1.3. Project Location

The EIS will contain a description of the geographical setting in which the project will take place. This description will focus on those aspects of the project and its setting that are important in order to understand the potential environmental effects of the project. The following information will be included:

- the Universe Transverse Mercator (UTM) coordinates of the main Project site;
- land use in the area currently;
- distance of the Project facilities and components to any federal lands;
- the environmental significance and value of the geographical setting in which the Project will take place and the surrounding area;
- environmentally sensitive areas, such as national, provincial and regional parks, ecological reserves, wetlands, estuaries, and habitats of federally or provincially listed species at risk and other sensitive areas;
- description of local communities; and
- traditional territories and/or consultation areas, treaty lands, Indian Reserve lands and Métis harvesting regions and/or settlements.

1.4. Regulatory framework and the role of government

The EIS will identify:

- any federal power, duty or function that may be exercised that would permit the carrying out (in whole or in part) of the Project or associated activities;
- legislation and other regulatory approvals that are applicable to the Project at the federal, provincial, regional and municipal levels;
- government policies, resource management plans, planning or study initiatives pertinent to the Project and/or EA and their implications;
- whether a request will be or was made to Transport Canada's Marine Safety Directorate to undertake the TERMPOL review process⁶;
- any treaty, self-government or other agreements between federal or provincial governments and Indigenous groups that are pertinent to the Project and/or EA;
- any relevant land use plans, land zoning, or community plans; and
- national, provincial and/or regional objectives, standards or guidelines that have been used by the proponent to assist in the evaluation of any predicted environmental effects.

2. PROJECT JUSTIFICATION AND ALTERNATIVES CONSIDERED

2.1. Purpose of the Project

The EIS will describe the purpose of the Project by providing the rationale for the Project, explaining the background, the problems or opportunities that the Project is intended to satisfy and the stated objectives from the perspective of the proponent. If the objectives of the Project are related to broader private or public sector policies, plans or programs, this information will also be included.

The EIS will also describe the predicted environmental, economic and social benefits of the Project. This information will be considered in assessing the justifiability⁷ of any significant adverse residual environmental effects as defined in section 5 of CEAA 2012, if such effects are identified.

⁶ TERMPOL Code: "Code of Recommended Standards for the Safety and Prevention of Pollution for Marine Transportation Systems and Related Assessment Procedures"

⁷ See subsection 52(2) of CEAA 2012.

2.2. Alternative means of carrying out the Project

The EIS will identify and consider the effects of alternative means of carrying out the Project that are technically and economically feasible. The proponent will complete the assessment of alternative means in accordance with the Agency's Operational Policy Statement entitled "*Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012*".

In its alternative means analysis, the proponent will address, at a minimum, the following project components:

- bitumen refining technologies;
- transportation of the following, including necessary infrastructure requirements and/or infrastructure upgrades, with means and routing considered:
 - raw materials, including pure bitumen (Neatbit™);
 - products, including diesel, jet fuel, and gasoline;
 - by-products, including propane, butane, and sulphur
- access to the Project site;
- location of key project components;
 - when and how the alternative locations would be considered
- energy sources to power the Project site;
- water and waste water management supply;
- water management and location of the final effluent discharge points; and
- the carbon capture or greenhouse gas emission reduction strategy.

The Agency recognizes that projects may be in the early planning stages when the EIS is being prepared. Where the proponent has not made final decisions concerning the placement of project infrastructure, the technologies to be used, or that several options may exist for various project components or activities, it is strongly encouraged to conduct an environmental effects analysis at the same level of detail for each of the various options available (alternative means) within the EIS.

3. PROJECT DESCRIPTION

3.1. Project components

The EIS will describe the Project, by presenting the Project components, associated and ancillary works, and other characteristics that will assist in understanding the environmental effects. This will include:

- all Project components as indicated in Part 1, section 3.1;
- maps, at an appropriate scale, of the Project location, the Project components, boundaries of the proposed site with UTM coordinates, the major existing infrastructure, adjacent land uses and any important environmental features;
- water management facilities proposed to control, collect and discharge surface drainage and groundwater seepage to the receiving environment from all key components;

- permanent and temporary linear infrastructures (road, railroad, pipelines, power supply), identifying the route of each of these linear infrastructures, the location and types of structure used for stream crossings;
- storage areas for fuels, explosives and hazardous wastes;
- drinking and industrial water requirements (source, quantity required, need for water treatment);
- energy supply (source, quantity);
- waste disposal (type of waste, method of disposal, quantity);

For project components associated with receiving raw product and transporting final products and by-products to market, the EIS will describe technically and economically feasible alternative means including:

- port infrastructure and facilities, specifying the type of vessels that will be used, any construction methods or modifications for wharfs (backfilling, sheet piling, pile dredging), as well as the dimensions of the wharfs, berthing areas, anchorage areas at the main terminal and in the navigation channel;
- dredging work (including any maintenance dredging anticipated), specifying the nature and volume of sediment, dredging methods (type of dredge, duration, frequency, etc.), surface area to be dredged, sediment management (land and aquatic), specifying the sediment disposal area, if necessary;
- navigation activities (number and frequency of trips), size and types of vessels, anticipated vessel routes and anchorages, predicted percentage of increase in vessel traffic of similar size vessels resulting from the Project, and ballast water management;
- pipeline infrastructure, size, routes and associated works
- rail line upgrades (including length and type of work involved), predicted volumes of traffic resulting from the Project and any associated works.

3.2. Project activities

The EIS will include descriptions of the construction, operation, decommissioning and abandonment associated with the proposed project.

This will include descriptions of the activities to be carried out during each phase, the location of each activity, expected outputs and an indication of the activity's magnitude and scale in relation to other similar activities.

Although a complete list of Project activities should be provided, the emphasis will be on activities with the greatest potential to have environmental effects. Sufficient information will be included to predict environmental effects and address concerns identified by the public and Indigenous groups. Highlight activities that involve periods of increased environmental disturbance or the release of materials into the environment.

The EIS will include a summary of the changes that have been made to the Project since it was originally proposed, including the benefits of these changes to the environment, Indigenous groups, and the public.

The EIS will include a schedule including time of year, frequency, and duration for all Project activities.

The information will include a description of:

3.2.1. Site preparation and construction

- site clearing, excavation;
- explosives manufacture and storage (location and management);
- blasting (frequency and methods);
- construction of access roads and rail yard;
- borrow materials requirement (source and quantity);
- characterization and management of bitumen including neatbit and dilbit variants if applicable. , waste rock, and overburden (storage, handling and transport of the volumes generated, mineralogical characterization, potential for metal leaching and acid rock drainage);
- water management, including water diversions, dewatering or deposition activities required (location, methods, timing);
- contribution to atmospheric emissions, including emissions profile (type, rate and source);
- equipment requirements (type, quantity);
- administrative buildings, garages, other ancillary facilities;
- construction camp (location, capacity, wastewater treatment);
- number of employees and transportation of employees;
- storage and management of hazardous materials, fuels and residues.

3.2.2. Operation

- refinery plan, fuel production, fuel stockpiling, diluant production and use;
- water management on the Project site including storm water, process water, wastewater, water recycling and effluent treatment (quantity, treatment requirements, release point(s));
- storage and handling of reagents, petroleum products, chemical products, hazardous materials and residual materials;
- air quality management including carbon capture, power generation and flaring;
- contribution to atmospheric emissions, including emissions profile (type, rate and source);
- waste management and recycling (other than water and atmospheric waste)
- characterization and management of workforce, including transportation, work schedules and lodging.

3.2.3. Decommissioning and abandonment

- the preliminary outline of a decommissioning and reclamation plan for any components associated with the Project;
- the ownership, transfer and control of the different Project components;
- the responsibility for monitoring and maintaining the integrity of the remaining structures;

- for permanent facilities, a conceptual discussion on how decommissioning and abandonment could occur.

4. PUBLIC PARTICIPATION AND CONCERNS

The EIS will describe the ongoing and proposed participation activities that the proponent will undertake or that it has already conducted on the Project. It will provide a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the consultation process. The EIS will indicate the methods used, where the consultation was held, the persons and organizations consulted, the concerns voiced and the extent to which this information was incorporated in the design of the Project as well as in the EIS. The EIS will provide a summary of key issues raised related to the Project and its potential effects to the environment as well as describe any outstanding issues and ways to address them.

5. ENGAGEMENT WITH INDIGENOUS GROUPS AND CONCERNS RAISED

For the purposes of developing the EIS, the proponent will engage with Indigenous groups that may be affected by the Project, to obtain their views on:

- effects of changes to the environment on Aboriginal peoples (health and socio-economic conditions; physical and cultural heritage, including any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and current use of lands and resources for traditional purposes) pursuant to paragraph 5(1)(c) of CEEA 2012, and
- potential adverse impacts of the Project on potential or established section 35 rights, including title and related interests, in respect of the Crown's duty to consult, and where appropriate, accommodate Aboriginal peoples.

With respect to the effects of changes to the environment on Aboriginal peoples, the assessment requirements are outlined in Part 2, sections 6.1.9 and 6.3.6 of these Guidelines. With respect to potential adverse impacts of the Project on potential or established section 35 rights, title and related interests, the EIS will document for each group identified in section 5.1, Part 2 of these Guidelines or any additional group identified in subsequent correspondence with the Agency the following:

- Potential or established section 35 rights⁸, including title and related interests, when this information is directly provided by a group to the proponent, the Agency, or review panel, or is available through public records including:
 - Geographical extent, nature, frequency and timing of the practice or exercise of the right; and,
 - Maps and data sets (e.g., fish catch numbers)

⁸ The 2011 *Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (the Guidelines)* defines Aboriginal rights as: practices, traditions and customs integral to the distinctive culture of the Aboriginal group claiming the right that existing prior to contact with the Europeans (Van de Peet). In the context of Métis groups, Aboriginal rights means practices, traditions, and customs integral to the distinctive culture of the Métis group that existed prior to effective European control, that is, prior to the time when Europeans effectively established political and legal control in the claimed area (*Powley*). Generally, these rights are fact and site specific. For greater certainty, the Guidelines also define Aboriginal title as an Aboriginal right. Visit the Indigenous and Northern Affairs Canada website at: www.aadnc-aandc.gc.ca/eng/1100100014680/1100100014681"

- Potential adverse impacts of each of the Project components and physical activities, in all phases, on potential or established section 35 rights, including title and related interests. This assessment is to be based on a comparison of the exercise of the identified rights, title and related interests between the predicted future conditions with the Project and the predicted future conditions without the Project. Both future scenarios should consider current conditions, including how they have been impacted by past (or historic) activities and development. Include the perspectives of potentially impacted Aboriginal groups where these were provided to the proponent by the groups.
- Measures identified to mitigate or accommodate potential adverse impacts of the Project on the potential or established section 35 rights, including title and related interests. These measures will be written as specific commitments that clearly describe how the proponent intends to implement them, and may go beyond mitigation measures that are developed to address potential adverse environmental effects;
- Potential adverse impacts on potential or established section 35 rights, including title and related interests that have not been fully mitigated or accommodated as part of the EA and associated engagement with Indigenous groups. The proponent will also take into account the potential adverse impacts that may result from the residual and cumulative environmental effects. Include the perspectives of potentially affected Aboriginal groups where these were provided to the proponent by the groups.

The information sources, methodology and findings of the assessment of paragraph 5(1)(c) effects may be used to inform the assessment of potential adverse impacts of the Project on potential or established section 35 rights, including title and related interests. However, there may be distinctions between the adverse impacts on potential or established section 35 rights, including title and related interests and the assessment of paragraph 5(1)(c) effects. The proponent will carefully consider the potential distinction between these two aspects and, where there are differences, will include the relevant information in its assessment.

In terms of gathering views from potentially affected Aboriginal groups with respect to both environmental effects of the Project and the potential adverse impacts of the Project on potential or established section 35 rights, including title and related interests, the EIS will document:

- VCs suggested by Aboriginal groups for inclusion in the EIS, whether they were included, and the rationale for any exclusions;
- specific suggestions raised by each Aboriginal group for mitigating the effects of changes to the environment on Aboriginal peoples or accommodating potential adverse impacts of the Project on potential or established section 35 rights, including title and related interests;
- views expressed by each Aboriginal group on the effectiveness of the mitigation or accommodation measures;
- from the proponent's perspective, any potential cultural, social and/or economic impacts or benefits to each Aboriginal group identified that may arise as a result of the Project. Include the perspectives of Aboriginal groups where these were provided to the proponent by the groups;
- any other comments, specific issues and concerns raised by Aboriginal groups and how they were responded to or addressed;

- changes made to the Project design and implementation directly as a result of discussions with potentially affected Aboriginal groups;
- where and how Aboriginal traditional knowledge was incorporated into the environmental effects assessment (including methodology, baseline conditions and effects analysis for all VCs) and the consideration of potential adverse impacts on potential or established section 35 rights, including title and related interests and related mitigation measures; and
- any additional issues and concerns raised by potentially affected Aboriginal groups in relation to the environmental effects assessment and the potential adverse impacts of the Project on potential or established section 35 rights, including title and related interests.

A suggested format for providing some of the information above is the creation of a tracking table of key issues raised by each Aboriginal group, including the concerns raised related to the Project, proposed mitigation options, and where appropriate, a reference to the proponent's analysis in the EIS. Information provided related to potential adverse impacts on potential or established section 35 rights will be considered by the Crown in meeting its common law duty to consult obligations as set out in the *Updated Guidelines for Federal Officials to Fulfill the Duty to Consult* (2011).

5.1. Indigenous Groups & Engagement Activities

With respect to engagement activities, the EIS will document:

- the engagement activities undertaken with each Aboriginal group prior to the submission of the EIS, including the date and means of engagement (e.g., meeting, mail, telephone);
- any future planned engagement activities;
- how engagement activities by the proponent allowed Aboriginal groups to understand the Project and evaluate its effects on their communities, activities, potential or established Aboriginal or treaty rights, title and related interests.

In preparing the EIS, the proponent will ensure that Aboriginal groups have access to timely and relevant information on the Project and how the Project may adversely impact them. The proponent will structure its Aboriginal engagement activities to provide adequate time for Aboriginal groups to review and comment on the relevant information. Engagement activities are to be appropriate to the groups' needs, arranged through discussions with the groups and in keeping with established consultation protocols, where available. The EIS will describe all efforts, successful or not, taken to solicit the information required from Aboriginal groups to support the preparation of the EIS.

The proponent will ensure that views of Aboriginal groups are recorded and that Aboriginal groups are provided with opportunities to validate the interpretation of their views. The proponent will keep detailed tracking records of its engagement activities, recording all interactions with Aboriginal groups, the issues raised by each Aboriginal group and how the proponent addressed the concerns raised. The proponent will share these records with the Agency.

For the Aboriginal groups expected to be most affected by the Project, the proponent is expected to strive towards developing a productive, respectful and constructive relationship based on on-going dialogue with the groups in order to support information gathering and the effects assessment. These groups include:

- Kitselas First Nation

- Haisla Nation
- Kitsumkalum Indian Band
- Metlakatla First Nation
- Lax Kw'alaams Band
- Gitxaala Nation; and
- Gitga'at Nation

For the above groups, the proponent will strive to use primary data sources and hold face-to-face meetings to discuss concerns. The proponent will facilitate these meetings by making key EA summary documents (baseline studies, EIS, key findings, plain language summaries) accessible in advance. The proponent will ensure there are sufficient opportunities for individuals and groups to provide oral input in the language of their choice. If possible, the proponent should consider translating information for these Aboriginal groups into the appropriate Aboriginal languages(s) in order to facilitate engagement activities during the EA.

For Aboriginal groups that may also be affected by the Project, but to a lesser degree, the proponent will ensure these groups are notified about key steps in the EIS development process and of opportunities to provide comments on key EA documents and/or information to be provided regarding their community. The proponent will still ensure these groups are reflected in the baseline information and assessment of potential effects or impacts in the EIS. These Aboriginal groups include:

- Haida Nation
- Heiltsuk First Nation
- Kitasoo/Xai'xais First Nation
- Métis Nation British Columbia

The groups referenced above may change as more is understood about the environmental effects of the Project and/or if the Project or its components change during the EA. The Agency reserves the right to alter the list of Aboriginal groups that the proponent will engage as additional information is gathered during the assessment.

Upon receipt of knowledge or information of potential effects or adverse impacts to an Aboriginal group not listed above, the proponent shall provide that information to the Agency at the earliest opportunity.

6. EFFECTS ASSESSMENT

6.1. Project setting and baseline conditions

Based on the scope of the project described in section 3 (Part 1), the EIS will present baseline information in sufficient detail to enable the identification of how the Project could affect the VCs and an analysis of those effects. Should other VCs be identified during the conduct of the EA, the baseline conditions for these components will also be described in the EIS. To determine the appropriate spatial boundaries to describe the baseline information, refer to section 3.2.3 (Part 1). As a minimum, the EIS will include a description of the following environmental components.

6.1.1. Atmospheric Environment

- ambient air quality in the project areas and, for the airshed likely to be affected by the Project, by identifying and quantifying emission sources and, in particular, the following contaminants: total suspended particulates, fine particulates smaller than 2.5 microns (PM_{2.5}), particulates less than 10 microns (PM₁₀), carbon monoxide (CO), sulphur oxides (SO_x), volatile organic compounds (VOCs) and nitrogen oxides (NO_x), hydrogen sulfide (H₂S) and all other toxic air pollutants (mobile and stationary sources);
 - emissions of each VOC should be specified individually;
- identify and quantify existing greenhouse gas emissions⁹ by individual pollutant measured as kilotonnes of CO₂ equivalent per year in the Project study areas;
- direct and indirect sources of air emissions;
- current provincial/territorial/federal limits for greenhouse gas emission targets;
- current ambient noise levels at key receptor points (e.g., Indigenous communities), including the results of a baseline ambient noise survey. Information on typical sound sources, geographic extent and temporal variations will be included;
- existing ambient night-time light levels at the Project site and at any other areas where Project activities could have an effect on light levels. The EIS will describe night-time illumination levels during different weather conditions and seasons; and
- historical records of relevant meteorological information (for example: total precipitation (rain and snow); mean, maximum and minimum temperatures; and typical wind speed and direction).

6.1.2. Geology and geochemistry

- the bedrock and host rock geology of the deposit, including a table of geologic descriptions, geological maps and cross-sections of appropriate scale;
- geomorphology, topography and geotechnical characteristics of areas proposed for construction of major project components;
- geological hazards that exist in the areas planned for the Project facilities and infrastructure, including:
 - history of seismic activity in the area;
 - isostatic rise or subsidence;
 - landslides, slope erosion and the potential for ground and rock instability, and subsidence during and following project activities;
 - history of landslide-generated tsunamis if near a shoreline; and
- baseline concentrations of contaminants of concern¹⁰ within the local, regional and downstream receiving environments;

6.1.3. Topography and soil

⁹ Greenhouse gas emissions include: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃).

¹⁰ Contaminants of concern include, but are not limited to, selenium, sulphate, cadmium, nitrate and calcite.

- baseline mapping and description of landforms and soils within the local and regional Project areas;
- maps depicting soil depth by horizon and soil order within the Project area to support soil salvage and reclamation efforts, and to outline potential for soil erosion;
- suitability of topsoil and overburden for use in the rehabilitation of disturbed areas.

6.1.4. Riparian, Wetland and Terrestrial Environments

- characterization of soils in the excavation area, in terrestrial and riparian environments, with a description of past uses;
- topography, drainage, geology and hydrogeology, and the physicochemical characteristics of potential on-land sediment or soil disposal sites;
- characterization of the shoreline, banks, current and future flood risk areas, and wetlands (fens, marshes, peatlands, mudflats and eelgrass beds, etc.), including the location and extent of wetlands likely to be affected by Project activities according to their size, type (wetland class and form), the description of their ecological function (ecological, hydrological, wildlife, socioeconomic, etc.) and species composition¹¹;
- identification of ecosystems that are sensitive or vulnerable to acidification resulting from the deposition of atmospheric contaminants; and
- plant and animal species (abundance, distribution and diversity) and their habitats, with a focus on species at risk or with special status that are of social, economic, cultural or scientific significance, as well as invasive alien species.

6.1.5. Groundwater and Surface Water

- hydrogeology, including:
 - hydrogeological context (e.g., hydrostratigraphy with aquifers and aquitards, major faults, etc.) including the delineation of key stratigraphic and hydrogeologic boundaries;
 - physical properties of the hydrogeological units (e.g., hydraulic conductivity, transmissivity, saturated thickness, storativity, porosity, specific yield);
 - groundwater flow patterns and rates;
 - a discussion of the hydrogeologic, hydrologic, geomorphic, climatic and anthropogenic controls on groundwater flow;
 - temporal changes in groundwater flow (e.g., seasonal and long term changes in water levels);
 - a delineation and characterization of groundwater - surface water interactions including temperature and the locations of groundwater discharge to surface water and surface water recharge to groundwater;

¹¹ The Canadian Wetland Classification System, National Wetlands Working Group, 1997, See the website http://www.gret-perg.ulaval.ca/fileadmin/fichiers/fichiersGRET/pdf/Doc_generale/WetlandsWetlands.pdf

- temperature changes in surface water as a result of groundwater-surface water interactions;
 - changes to surface water quality, including seasonal changes in runoff entering watercourses;
- hydrogeological maps and cross-sections for the Project area to outline the extent of aquifers and aquitards, including bedrock fracture and fault zones, locations and depths of wells and strainers, groundwater types springs, surface waters, and project facilities. Groundwater levels, potentiometric contours, flow directions, groundwater divides and areas of recharge and discharge should be included;
 - all groundwater monitoring wells, including their location, in respect to the Project area, including geologic, hydrostratigraphic, piezometric and construction data (e.g., depths of surficial rock and bedrock, bedrock quality, fracture zones, piezometric levels, hydraulic conductivity, diameter and screen depth and intercepted aquifer unit);
 - monitoring protocol for collection of existing groundwater and surface water data;
 - an appropriate hydrogeologic model for the Project area, which discusses the hydrostratigraphy and groundwater flow systems; a sensitivity analysis will be performed to test model sensitivity to climatic variations (e.g., recharge) and hydrogeologic parameters (e.g., hydraulic conductivity);
 - groundwater quality, including lab analytical results for metals, major ions and physical parameters, including temperature, with the interpretation of results for any anomalous values and for contaminants of concern;
 - graphs or tables indicating the seasonal variations in groundwater levels, flow regime, and quality;
 - local and regional potable groundwater supplies, including their current use and potential for future use;
 - bedrock fracture sizes and orientations in relation to groundwater flow;
 - the delineation of drainage basins, at appropriate scales (water bodies and watercourses), including intermittent streams, flood risk areas and wetlands, boundaries of the watershed and subwatersheds, overlaid by key Project components;
 - hydrological regimes, including monthly, seasonal and annual water flow (discharge) data;
 - for each affected water body, the total surface area, bathymetry, maximum and mean depths, water level fluctuations, type of substrate (sediments);
 - seasonal surface water quality, including analytical results (e.g. water temperature, turbidity, pH, dissolved oxygen profiles) and interpretation for representative tributaries and water bodies including all sites to receive mine effluents or runoff;
 - any local and regional potable surface water resource; and
 - sediment quality analysis for key sites likely to receive Project effluents.

6.1.6. Marine environment

- marine water quality;
- bottom sediments, including quality, thickness, grain size and mobility;

- surface and subsurface current patterns, current velocities, waves, storm surges, long shore drift processes, tidal patterns, and tide gauges levels for the site, in proximity to the site, and along the shipping routes;
- available bathymetric information for the site and along shipping routes if applicable;
- ice climate in the regional study area, including ice formation and thickness, ridging, breakup and movement;
- ice conditions along the shipping routes will also be discussed with consideration of predicted climate change and its possible effect on the timing of ice formation in the future;
- fast-ice characteristics, including its surface area and seasonal stability at the site of the proposed port and along the shipping routes;
- marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae and phytoplankton;
- marine fauna, including benthic organisms, fish, marine mammals and sea turtles and their associated habitat; and
- federally and provincially listed marine species at risk.

6.1.7. Fish and fish habitat

For potentially affected surface waters:

- a characterization of fish populations on the basis of species and life stage, including information on the surveys carried out and the source of data available (e.g. location of sampling stations, catch methods, date of catches, species, catch-per-unit effort);
- a description of primary and secondary productivity in potentially affected water bodies with a characterisation of season variability;
- a list of any fish or invertebrate species at risk that are known to be present;
- a description of the habitat by homogeneous section, including the length of the section, width of the channel from the high water mark (bankful width), water depths, type of substrate (sediments), aquatic and riparian vegetation, and photos;
- a description of natural obstacles (e.g. falls, beaver dams) or existing structures (e.g. water crossings) that hinder the free passage of fish;
- maps, at a suitable scale, indicating the surface area of potential or confirmed fish habitat for spawning, rearing, nursery, feeding, overwintering, migration routes, etc. Where appropriate, this information should be linked to water depths (bathymetry) to identify the extent of a water body's littoral zone; and,
- the description and location of suitable habitats for fish species at risk that appear on federal and provincial lists and that are found or are likely to be found in the study area.

Note that certain intermittent streams or wetlands may constitute fish habitat or contribute indirectly to fish habitat. The absence of fish at the time of the survey does not irrefutably indicate an absence of fish habitat.

6.1.8. Migratory birds and their habitat¹²

- birds and their habitats that are found or are likely to be found in the study area. This description may be based on existing sources, but supporting evidence is required to demonstrate that the data used are representative of the avifauna and habitats found in the study area. The existing data must be supplemented by surveys, if required;
- abundance, distribution and life stages of migratory birds (including waterfowl, raptors, shorebirds, marsh birds and other land and marine birds) likely to be affected in the project area based on existing information, or surveys, as appropriate, to provide current field data; and
- year-round migratory bird use of the area (e.g., winter, spring migration, breeding season, fall migration), based on preliminary data from existing sources and surveys to provide current field data, if appropriate.

6.1.9. Species at Risk

- a list of all potential or known federally listed species at risk that may be affected by the Project, using existing data and literature as well as surveys to provide current field data;
- a list of all federal species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for listing on Schedule 1 of the *Species at Risk Act*. This will include those species in the risk categories of extirpated, endangered, threatened and special concern¹³;
- any published studies that describe the regional importance, abundance and distribution of species at risk including recovery strategies or plans. The existing data must be supplemented by surveys if required;
- residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified critical habitat and/or recovery habitat (where applicable) and general life history of species at risk that may occur in the Project area, or be affected by the Project.

6.1.10. Aboriginal peoples

With respect to potential effects on Aboriginal peoples and the related VCs, baseline information will be provided for each group identified in Part 2, section 5.1 (and any groups identified after these Guidelines are finalized). Baseline information will describe and characterize the elements in paragraph 5(1)(c) of CEEA 2012 based on the spatial and temporal scope selected for the assessment according to the factors outlined in Part 1, section 3.2.3. Baseline information will also characterize the regional context of each of the paragraph 5(1)(c) elements to support the assessment of project related effects and cumulative effects. Baseline information will be sufficient to provide a comprehensive understanding of the current state of each VC.

¹² Surveys should be designed with reference to the Canadian Wildlife Service's guidance such as Technical Report No. 508, *A Framework for the Scientific Assessment of Potential Project Impacts on Birds* (Hanson *et al.* 2009). Appendix 3 of the Framework provides examples of project types and recommended techniques for assessing impacts on migratory birds.

¹³ Proponents are encouraged to consult COSEWIC's annual report for a listing of the designated wildlife species: http://www.cosewic.gc.ca/eng/sct0/index_e.cfm#sar

Baseline information for current use of lands and resources for traditional purposes will focus on the traditional activity (e.g. hunting, fishing, trapping, plant gathering) and include a characterization of all attributes of the activity that can be affected by environmental change. This includes not only identifying species of importance but also assessing the quality and quantity of preferred traditional resources and locations, timing (e.g., seasonality, access restrictions, distance from community), ambient/sensory environment (e.g., noise, air quality, visual landscape, presence of others) and cultural environment (e.g., historical/generational connections, preferred areas). Specific aspects that will be considered include, but are not limited to:

- location of traditional territory (including maps where available);
- traditional uses current practiced or practiced in recent history;
- location of reserves and communities;
- location of hunting camps, cabins and traditional gathering or teaching grounds;
- fish, wildlife, birds, plants or other natural resources of importance for traditional use;
- places where fish, wildlife, birds, plants or other natural resources are harvested, including places that are preferred;
- access and travel routes for conducting traditional practices;
- frequency, duration or timing of traditional practices;
- cultural values associated with the area affected by the Project and the traditional uses identified.

Baseline information for health¹⁴ and socio-economic conditions will include the functioning and health of the socio-economic environment, encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities. Specific aspects that will be considered include, but are not limited to:

- drinking water sources (permanent, seasonal, periodic, or temporary);
- reliance on country foods (also known as traditional foods) including food that is trapped, fished, hunted, harvested or grown for subsistence or medicinal purposes, outside of the commercial food chain;
- which country foods are consumed by which groups, how frequently, and where these country foods are harvested;
- commercial activities (e.g. fishing, trapping, hunting, forestry, outfitting); and
- recreational uses.

Baseline information for physical and cultural heritage¹⁵ (including any site, structure or thing of archaeological, paleontological, historical or architectural significance) will consider all elements of cultural and historical importance to Aboriginal groups in the area and is not restricted to artifacts

¹⁴ The proponent should refer to Health Canada's *Useful Information for Environmental Assessments* document in order to include the appropriate baseline information relevant to human health. This document can be obtained at http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/enviro_n_assess_eval/index-eng.php

¹⁵ Heritage resources to be considered will include but not be limited to, physical objects (e.g. middens, culturally-modified trees, historic buildings), sites or places (e.g. burial sites, sacred sites, cultural landscapes) and attributes (e.g. language, beliefs).

considered under provincial heritage legislative requirements. Specific aspects that will be considered include, but are not limited to:

- burial sites;
- cultural landscapes;
- sacred, ceremonial or culturally important places, objects or things; and
- archaeological potential and/or artifacts places.

Any other baseline information that supports the analysis of predicted effects on Indigenous peoples will be included as necessary. The EIS will also indicate how input from groups, including Aboriginal traditional knowledge, was used in establishing the baseline conditions related to health and socio-economics, physical and cultural heritage and current use of lands and resources for traditional purposes. This information includes but is not limited to the following:

- areas of concentration of migratory animals, such as breeding, denning and/or wintering areas;
- ungulates, furbearers, amphibians, small mammals, and their habitat;
- existing or proposed protected areas, special management areas, and conservation areas in the regional study area;
- wetlands most likely to be affected by project activities according to their location, size, type (wetland class and form), species composition and ecological function (Canadian Wetland Classification System, National Wetlands Working Group, 1997);
- key plant communities and animals that rely on wetlands; and,
- submerged floating and emergent aquatic vegetation.

6.1.11. Other Changes to the Environment Arising as a Result of a Federal Decision or due to changes on federal lands, in another province or outside Canada

Should there be the potential for a change to the environment arising as a result of a federal decision(s), or on federal lands, lands in another province or lands outside Canada, the EIS will include baseline information on the environmental component likely to be affected (if this information is not already covered in other subsections of these Guidelines). For example, if an authorization provided under the *Fisheries Act* was to result in the flooding of wildlife habitat, baseline information should be provided on the wildlife species likely to be affected.

6.1.12. Human environment

- the rural and urban settings likely to be affected by the Project;
- any federal lands, lands located outside the province or Canada that may be affected by the Project;
- the current use of land in the study area, including a description of hunting, recreational and commercial fishing, trapping, gathering, outdoor recreation, use of seasonal cabins, outfitters;
- current use of all waterways and water bodies that will be directly affected by the Project, including recreational uses, where available;

- location of and proximity of any permanent, seasonal or temporary residences or camps;
- health¹⁶ and socio-economic conditions, including the functioning and health of the socio-economic environment, encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities; and
- physical and cultural heritage, including structures, sites or things of historical, archaeological, paleontological or architectural significance.

6.2. Predicted Changes to the Physical Environment

The assessment will include a consideration of the predicted changes to the environment as a result of the Project being carried out or as a result of any powers duties or functions that are to be exercised by the federal government in relation to the Project. These predicted changes to the environment are to be considered in relation to each phase of the Project (construction, operation, decommissioning, and abandonment) and are to be described in terms of the magnitude, geographic extent, duration and frequency, and whether the environmental changes are reversible or irreversible. As changes to various parts of the physical environment, listed below, may be inter-related as part of an ecosystem, the EIS will explain and describe the connections between the changes described.

6.2.1. Changes to the Atmospheric Environment

- The proponent will carry out atmospheric dispersion modelling of the main contaminants in order to estimate the contaminant concentrations present in the entire area that could potentially be affected by atmospheric emissions (Part 2, Section 6.1.1) resulting from various Project-related activities (sources), including the use of heavy machinery during construction; the operation of the refinery and marine terminal; fugitive emissions from the pipelines; and road, rail and marine transportation. The proponent will be required to compare anticipated air quality against the *Canadian Ambient Air Quality Standards* (CAAQS) for fine particulate matter;
- a description of all methods and practices (e.g., control equipment, heat or gas recovery systems) that will be implemented to minimize and control atmospheric emissions throughout the project life cycle. If the best available technologies are not included in the Project design, the proponent will need to provide a rationale for the technologies selected;
- an estimate of the direct greenhouse gas emissions associated with all phases of the Project as well as any mitigation measures proposed to minimize greenhouse gas emissions. This information is to be presented by individual pollutant and should also be summarized in CO₂ equivalent per year. The proponent must provide the following information:
 - ✓ an estimate of the contribution of the Project emissions at the local, provincial and federal scale. The proponent must indicate the category into which the Project falls in terms of the relative magnitude of its contribution to greenhouse gas emissions (Project with low, medium or high emission rates);

¹⁶ The proponent should refer to Health Canada's *Useful Information for Environmental Assessments* document in order to include the appropriate baseline information relevant to human health. This document can be obtained at http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/environ_assess-eval/index-eng.php

- ✓ a greenhouse gas emissions management plan providing a description of the potential for fugitive emissions and the methods used to detect and repair leaks in the refinery and associated infrastructure;
 - ✓ a justification of all estimates and emission factors used in the analysis;
 - ✓ the methods and calculations used for the analysis;
 - ✓ a comparison and an assessment of the level of estimated emissions to the regional, provincial and federal emission targets;
 - ✓ information related to the Project's electrical demand and sources of electrical power for facilities and equipment, i.e., the Project's main source and any other additional sources (generators, etc.), as appropriate;
 - ✓ an estimate of the greenhouse gas emissions associated with the facility's bitumen supply. This should include all raw materials to be processed at the proposed refinery and, if any, greenhouse gas emitted from power generation at the refinery, pipelines and marine terminal, or other on-site processes. This estimate should include all processes upstream of the proposed refinery. "Upstream" includes, but is not limited to, bitumen production, processing and transport;
 - ✓ an estimate of all greenhouse gas emissions during the operational lifetime of the proposed refinery, on an annual basis. In cases where bitumen supply source has not yet been determined, the proponent should estimate using a typical bitumen source;
 - ✓ emission factors for all upstream stages should be recent and pertinent to the region;
- changes in ambient noise levels; and
 - changes in night-time light levels.

6.2.2. Changes to Groundwater and Surface Water

- changes to groundwater flow patterns, fluxes, and ditches based on the results of groundwater flow modelling that incorporates changes related to the Project;
- changes to turbidity, oxygen level, water temperature, ice regime, water quality;
- changes in surface water quality associated with any Project effluent releases or surface runoff;
- changes to the hydrological and hydrometric conditions;
- changes to groundwater recharge/discharge areas and any changes to groundwater infiltration areas; and
- changes to groundwater quality associated with storage or release of any Project effluents or drainage including surface runoff.

6.2.3. Changes to Riparian, Wetland and Terrestrial Environment

- overall description of changes related to landscape disturbance;
- changes to the habitat of migratory birds, including losses, structural changes and fragmentation of riparian habitat (aquatic grassbeds, intertidal marshes) of terrestrial environments and wetlands frequented by birds (types of cover, ecological unit of the area in terms of quality, quantity, diversity, distribution and functions);
- changes to critical habitat for federally listed species at risk; and

- changes to key habitat for species important to current use of lands and resources for traditional purposes including habitat fragmentation, loss of migration corridors, and decreases in habitat quality (e.g. sensory disturbances);

6.3. Predicted Effects on Valued Components

Based on the predicted changes to the environment identified in section 6.2, the proponent is to assess the environmental effects on the following VCs. All interconnections between VCs and between changes to multiple VCs will be described:

6.3.1. Fish and Fish Habitat

- the identification of any potential adverse effects to fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act* including the calculations of any potential habitat loss (temporary or permanent) in terms of surface areas (e.g. spawning grounds, fry-rearing areas, feeding), and in relation to watershed availability and significance. The assessment will include a consideration of:
 - geomorphological changes and their effects on hydrodynamic conditions and fish habitats (e.g. modification of substrates, dynamic imbalance, silting of spawning beds);
 - modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, fry-rearing, movements);
 - potential effects on riparian areas that could affect aquatic biological resources and productivity taking into account any anticipated modifications to fish habitat;
 - any potential imbalances in the food web in relation to baseline;
 - effects on the primary and secondary productivity of water bodies and how Project-related effects may affect fish food sources;
- the effects of changes to the aquatic environment on fish and their habitat, including:
 - the anticipated changes in the composition and characteristics of the populations of various fish species, including shellfish and forage fish;
 - any modifications in migration or local movements (upstream and downstream migration, and lateral movements) following the construction and operation of works (physical and hydraulic barriers);
 - any reduction in fish populations as a result of potential overfishing due to increased access to the Project area;
 - any modifications and use of habitats by federally or provincially listed fish species;
- a discussion of how Project construction timing correlates to key fisheries windows for freshwater and anadromous species, and any potential impacts resulting from overlapping periods;
- a discussion of how vibration caused by blasting, flaring, road and rail use, and other operations may affect fish behaviour, such as spawning or migrations.

6.3.2. Marine Environment

- the physical effects on the estuarine and marine environment, including changes to water quality, chemical composition, temperature, oceanographic conditions, etc.;
- the effects to the use of the marine environment, including estuarine, floodplain and marine habitats by fish, invertebrates and marine mammals with regard to their life cycles (e.g. migration, spawning, emergence);
- any effects resulting from overlapping periods between construction periods and key fisheries (e.g. commercial salmon fishery) windows for marine species;
- any effects to marine organisms including marine fish, marine mammals, marine birds, sea turtles, benthic organisms, detached algae, marine flowering plants, brown algae, green algae and phytoplankton, etc.

6.3.3. Marine Plants

- marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae and phytoplankton.

6.3.4. Migratory Birds

- direct and indirect adverse effects on migratory birds, including population level effects that could be caused by all project activities, including but not limited to:
 - site preparation;
 - deposit of harmful substances in waters that are frequented by migratory birds ;
 - flaring of gas ;and
 - creation of settling ponds that may be attract and be used by migratory birds.
- collision risk of migratory birds with any project infrastructures;
- indirect effects caused by increased disturbance (e.g. noise, light, presence of workers), relative abundance movements, and losses or changes in migratory bird habitat, considering the critical breeding and migration periods for the birds.

6.3.5. Species at Risk

- the potential effects of the Project on federally listed species at risk and those species listed by the Committee on the Status of Endangered Wildlife in Canada classified as extirpated, endangered, threatened or of special concern and their critical habitat, including:
 - direct and indirect effects from increased exposure to contaminants of concern; and
 - direct and indirect effects on the survival or recovery of federally listed species.

6.3.6. Aboriginal peoples

With respect to Aboriginal peoples, a description and analysis of how changes to the environment caused by the Project will affect each Aboriginal group's:

- current use of land and resources for traditional purposes. This assessment will characterize the effect(s) on the use or activity (e.g., hunting, fishing, trapping, plant gathering) as a result of the underlying changes to the environment (i.e., how will the

activity change if the Project proceeds). The underlying changes to the environment will also be described, including, but not limited to:

- any changes to resources (fish, wildlife, birds, plants or other natural resources) used for traditional purposes (e.g. hunting, fishing, trapping, collection of medicinal plants, use of sacred sites);
 - any changes or alterations to access into the areas used for traditional purposes, including development of new roads, deactivation or reclamation of access roads and changes to waterways that affect navigation;
 - any changes to the environment that affect cultural value or importance associated with traditional uses or areas affected by the Project (e.g. values or attributes of the area that make it important as a place for inter-generational teaching of language or traditional practices, communal gatherings, integrity of preferred practice areas);
 - how timing of Project activities that have the potential to affect Aboriginal peoples (e.g. construction, blasting, discharges) interacts with the timing of traditional practices, and any potential effects resulting from overlapping periods;
 - any changes to the alienation of lands from Aboriginal traditional use, including consideration of the regional context for traditional use, and the value of the Project area in that regional context;
 - any changes to environmental quality (e.g. air, water, soil) or the sensory environment (e.g. noise, light, visual landscape, scent), or perceived disturbance of the environment (e.g. fear of contamination of water or country foods) that could detract from Aboriginal use of the area or lead to avoidance of the area by Aboriginal peoples;
 - any changes to the environment resulting from the presence of workers or increased access to the area by non-Aboriginal people (e.g. noise, competition for or pressure on resources); and
 - an assessment of the potential to return affected areas to pre-project conditions to support traditional practices.
- human health, focusing on effects on health outcomes or risks in consideration of, but not limited to, potential changes in air quality, quality and effects of vibration from blasting, availability of country foods, water quality (drinking, recreational and cultural uses), and noise exposure. When risks to human health due to changes in one or more of these components are predicted, a complete Human Health Risk Assessment (HHRA) examining all exposure pathways for pollutants of concern may be necessary to adequately characterize potential risks to human health. Where adverse health effects are predicted, any incidental effects such as effects on current use of lands and resources for traditional purposes will also be assessed. The proponent must provide a justification if it determines that an assessment of the potential for contamination of country foods is not required or if any possible contaminants are excluded from the assessment;
- socio-economic conditions, including but not limited to:
- the use of navigable waters;
 - forestry and logging operations;
 - commercial fishing, hunting, trapping, and gathering activities;
 - commercial outfitters; and

- recreational use.
- physical and cultural heritage, and structure, site or thing of historical, archaeological, paleontological or architectural significance to Aboriginal groups, including, but not limited to:
 - the loss or destruction of physical and cultural heritage;
 - changes to access to physical and cultural heritage; and
 - changes to the cultural value or importance associated with physical and cultural heritage.

Other effects of changes to the environment on Aboriginal peoples should be reflected as necessary.

6.3.7. Other valued components that may be affected as a result of a federal decision or due to effects on federal lands, another province or outside Canada

The EIS will consider any changes to the environment arising as a result of a federal decision, such as an authorization under section 35 of the *Fisheries Act*, that have not already been address in other subsections of these guidelines. The EIS will describe the project components and activities for which the decision is required, and any additional VCs not already assessed.

6.4. Mitigation

Every EA conducted under CEAA 2012 will consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project. Under CEAA 2012, mitigation includes measures to eliminate, reduce or control the adverse environmental effects of a designated project, as well as restitution for damage to the environment through replacement, restoration, compensation or other means. Measures will be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation. Mitigation measures may be considered for inclusion as conditions in the EA decision statement and/or in other compliance and enforcement mechanisms provided by other authorities' permitting or licensing processes.

As a first step, the proponent is encouraged to use an approach to avoid and reduce the effects at the source. Such an approach may include the modification of the design of the Project or relocation of project components.

The EIS will describe the standard mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied as part of standard practice regardless of location. In some cases an EIS may propose a comprehensive suite of mitigation measures that address VCs not assessed under CEAA 2012. As such the proponent will identify which mitigation measures are necessary to reduce the significance of adverse effects to areas of federal jurisdiction, and which measures it considers to be additional, or outside federal jurisdiction.

The EIS will describe the Project's environmental protection plan and its environmental management system, through which the proponent will deliver this plan. The plan will provide an overall perspective on how potentially adverse effects would be minimized and managed over time. The EIS will further discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.

The EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation is designed to address. The EIS will describe mitigation measures in relation to species and/or critical habitat listed under the *Species at Risk Act*. These measures will be consistent with any applicable recovery strategy and action plans.

The EIS will specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the Project's various phases to eliminate or reduce the significance of adverse effects. The EIS will also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. The reasons for determining if the mitigation measure reduces the significance of an adverse effect will be made explicit. The proponent is also encouraged to identify mitigation measures for effects that are adverse although not significant.

The EIS will indicate what other technically and economically feasible mitigation measures were considered, and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation will be justified. The EIS will identify who is responsible for the implementation of these measures and the system of accountability.

Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective will be clearly and concisely described. In addition, the EIS will identify the extent to which technological innovations will help mitigate environmental effects. Where possible, it will provide detailed information on the nature of these measures, their implementation, management and the requirements of the follow-up program.

Adaptive management is not considered a mitigation measure, but if the follow-up program (refer to section 8) indicates that corrective action is required, the proposed approach for managing the action should be identified.

6.5. Significance of residual effects

After having established the technically and economically feasible mitigation measures, the EIS will present any residual environmental effects of the Project on the VCs identified in section 6.3. All residual effects, even if very small or deemed insignificant will be described.

The EIS will then provide an analysis of the significance of the residual environmental effects that are considered adverse following the implementation of mitigation measures, using guidance described in section 4 of the Agency's Operational Policy Statement, *Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012*¹⁷.

The EIS will identify the criteria used to assign significance ratings to any predicted adverse effects. It will contain clear and sufficient information to enable the Agency or the review panel, technical and

¹⁷ Visit the Canadian Environmental Assessment Agency's website at: <http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=363DF0E1-1>

regulatory agencies, Aboriginal groups and the public to review the proponent's analysis of the significance of effects. The EIS will document the terms used to describe the level of significance.

The following criteria should be used in determining the significance of residual effects:

- magnitude;
- geographic extent;
- duration;
- frequency;
- reversibility;
- ecological and social context (the ecological and social context within which potential environmental effects may occur should be taken into account when considering the key criteria above in relation to a particular VC, as the context may help better characterize whether adverse effects are significant.); and
- existence of environmental standards, guidelines or objectives for assessing the effect.

In assessing significance against these criteria the proponent will, where possible, use relevant existing regulatory documents, environmental standards, guidelines, or objectives such as prescribed maximum levels of emissions or discharges of specific hazardous agents into the environment. The EIS will contain a section which explains the assumptions, definitions and limits to the criteria mentioned above in order to maintain consistency between the effects on each VC.

Where significant adverse effects are identified, the EIS will set out the probability (likelihood) that they will occur, and describe the degree of scientific uncertainty related to the data and methods used within the framework of its environmental analysis.

6.6. Other effects to consider

6.6.1. Effects of potential accidents or malfunctions

The failure of certain works caused by human error or exceptional natural events (e.g. flooding, earthquake, forest fire) could cause major effects. The proponent will therefore conduct an analysis of the risks of accidents and malfunctions, determine their effects and present a preliminary emergency response measures.

Taking into account the lifespan of different Project components, the proponent will identify the probability of potential accidents and malfunctions related to the Project, including an explanation of how those events were identified, potential consequences (including the environmental effects as defined in section 5 of CEAA 2012), the plausible worst case scenarios and the effects of these scenarios.

This assessment will include an identification of the magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events and would potentially result in an adverse environmental effect as defined in section 5 of CEAA 2012.

The EIS will describe the safeguards that have been established to protect against such occurrences and the contingency and emergency response procedures that would be put in place if such events do occur.

Accidents or Malfunctions Related to Marine and Rail Transportation

The proponent will describe and evaluate the potential effects to the environment caused by accidents and malfunctions resulting from marine and rail transportation that is incidental to the Project, including effects on social, economic or cultural elements of the environment and on people's health in the vicinity of spilled contaminants.

If serious accidents or malfunctions are likely to occur and if the necessary data are available, the proponent will determine whether it is necessary to carry out an assessment of the probability that such an event occur and an assessment of its consequences, taking into account the contributing factors such as weather conditions or external events.

The proponent will also assess the potential of minor and major accidental release of fuel, or loss of dangerous goods. If necessary, the proponent will also provide an analysis of the potential environmental effects of these discharges on aquatic and terrestrial environments and on human health in spatial boundaries described in this document.

The proponent will also describe existing emergency preparedness and response systems and existing arrangements with the responsible response organizations in the marine and rail transportation spatial boundaries associated with the Project, including exercise and training plans for spill emergency response. The proponent will describe the role it will play in case of spill, collision, grounding or other accidents or malfunctions related to rail and maritime transportation associated with the Project.

6.6.2. Effects of the environment on the Project

The EIS will take into account how local conditions (including other nearby human activity) and natural hazards, such as severe and/or extreme weather conditions and external events (e.g., flooding, drought, ice jams, landslides, avalanches, erosion, subsidence, fire, outflow conditions and seismic events), could adversely affect the Project and how this in turn could result in effects to the environment (e.g., extreme environmental conditions result in malfunctions and accidental events). These events will be considered in different probability patterns (e.g., 5-year flood vs. 100-year flood).

The EIS will provide details of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the Project.

6.6.3. Cumulative effects assessment

The proponent will identify and assess the Project's cumulative effects using the approach described in the Agency's Operational Policy Statement entitled *Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* and the guide entitled *Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012*.¹⁸

Cumulative effects are defined as changes to the environment due to the Project combined with the existence of other past, present and reasonably foreseeable physical activities. Cumulative effects may result if:

¹⁸ Visit the Canadian Environmental Assessment Agency's website at: www.ceaa-acee.gc.ca

- the implementation of the Project may cause direct residual adverse effects on the VC, taking into account the application of technically and economically feasible mitigation measures; and,
- the same VC may be affected by other past, present or reasonably foreseeable physical activities.

VCs that would not be affected by the Project or would be affected positively by the Project can be omitted from the cumulative effects assessment so long as a rationale is provided for the omission. A cumulative effect on an environmental component may, however, be important even if the assessment of the Project's effects on this component reveals that the effects of the project are minor.

In its EIS, the proponent will:

- Identify and justify the spatial and temporal boundaries for the cumulative effect assessment for each VC selected. The boundaries for the cumulative effects assessments will generally be different for each VC considered. These cumulative effects boundaries will also generally be larger than the boundaries for the corresponding Project effects;
- Identify the sources of potential cumulative effects. Specify other projects or activities that have been or that are likely to be carried out that could cause effects on each selected VC within the boundaries defined, and whose effects would act in combination with the residual effects of the Project. This assessment may consider the results of any relevant study conducted by a committee established under section 73 or 74 of CEAA 2012;
- Assess the cumulative effects on each VC selected by comparing the future scenario with the Project and without the Project. Effects of past activities (activities that have been carried out) will be used to contextualize the current state of the VC. In assessing the cumulative effects on current use of lands and resources for traditional purposes, the assessment will focus on the cumulative effects on the relevant activity (e.g., hunting, fishing, trapping, plant harvesting);
- Describe the mitigation measures that are technically and economically feasible. The proponent shall assess the effectiveness of the measures applied to mitigate the cumulative effects. In cases where measures exist that are beyond the scope of the proponent's responsibility that could be effectively applied to mitigate these effects, the proponent will identify these effects and the parties that have the authority to act. In such cases, the EIS will summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term;
- Determine the significance of the cumulative effects; and
- Develop a follow-up program to verify the accuracy of the assessment and verify the effectiveness of mitigation measures for certain cumulative effects.

The proponent is encouraged to consult with key stakeholders and Indigenous groups prior to finalizing the choice of VCs and the appropriate boundaries to assess cumulative effects.

7. SUMMARY OF ENVIRONMENTAL IMPACT STATEMENT

The EIS will contain a table summarising the following key information:

- potential environmental effects on valued components;

- proposed mitigation measures to address the effects identified above;
- potential residual effects and the significance of the residual environmental effects.

The summary table will be used in the EA Report prepared by the Agency or will be considered by the review panel. An example of a format for the key summary table is provided in Appendix 1 of this document.

In a second table, the EIS will summarize all key mitigation measures and commitments made by the proponent which will mitigate any significant adverse effects of the Project on VCs (i.e., those measures that are essential to ensure that the Project will not result in significant adverse environmental effects).

8. FOLLOW-UP AND MONITORING PROGRAMS

A follow-up program is designed to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the Project.

Considerations for developing a follow-up program will include:

- whether the Project will impact environmentally sensitive area/VCs or protected areas or areas under consideration for protection;
- the nature of public concerns raised about the Project;
- the accuracy of predictions;
- whether there is a question about the effectiveness of mitigation measures or the proponent proposes to use new or unproven techniques and technology, or if the techniques and technology have never been used in this combination or at this scale;
- the nature of the cumulative environmental effects;
- the nature of the Project;
- whether there was limited scientific knowledge about the effects in the EA.

The goal of a monitoring program is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of project development, and to provide clearly defined action plans and emergency response procedures to ensure human and environmental health and safety.

8.1. Follow-up Program

The duration of the follow-up program shall be as long as required to evaluate the effectiveness of the mitigation measures.

The EIS shall present a preliminary follow-up program and shall include:

- objectives of the follow-up program and the VCs targeted by the program;
- list of elements requiring follow-up;
- number of follow-up studies planned as well as their main characteristics (list of the parameters to be measured, planned implementation timetable, etc.);
- intervention mechanism used in the event that an unexpected deterioration of the environment is observed;
- mechanism to disseminate follow-up results among the concerned populations;
- accessibility and sharing of data for the general population;
- opportunity for the proponent to include the participation of Aboriginal groups and stakeholders on the affected territory, during the development and implementation of the program;
- involvement of local and regional organizations in the design, implementation and evaluation of the follow-up results as well as any updates, including a communication mechanism between these organizations and the proponent
- how Aboriginal groups will be engaged in the follow-up program.

8.2. Monitoring

The proponent will prepare an environmental monitoring program for all phases of the Project.

Specifically, the EIS shall present an outline of the preliminary environmental monitoring program, including the:

- identification of regulatory instruments that include a monitoring program requirement for the valued components;
- description of the characteristics of the monitoring program where foreseeable (e.g., location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, human and financial resources required);
- description of the proponent's intervention mechanisms in the event of non-compliance with the regulatory requirements;
- guidelines for monitoring reports (number, content, frequency, format) that will be sent to the Agency;
- how Aboriginal groups will be engaged in monitoring programs.

Appendix 1 Example - Summary Table of Environmental Assessment

Valued Component affected	Area of federal jurisdiction ¹⁹ (√)	Project Activity	Potential effects	Proposed mitigation	Residual effect	<i>Magnitude</i>	<i>Extent</i>	<i>Duration</i>	<i>Frequency</i>	<i>Reversibility</i>	<i>Ecological context</i>	<i>Other criteria used to determine significance</i>	Significance of residual adverse effect
Fish and fish habitat													
Migratory birds													
Species at risk													
Current use of land and resource for traditional purpose	√ 5(1)(c)(iii)												
Any other VCs identified													

¹⁹ Indicate by a check mark which valued components can be considered “environmental effects” as defined in section 5 of CEAA 2012, and specify which subsection of this Act is relevant. For example, for the VC “Use of land and resources by Aboriginal people”, the appropriate cell would indicate, section 5(1)(c)(iii).