



Generic Guidelines for the Preparation of an Environmental Impact Statement

Pursuant to the *Canadian Environmental
Assessment Act, 2012*

Version 2

March 2021

e-Doc: 4904776 (Word)

e-Doc: 6503873 (PDF)



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Catalogue number: CC172-132/2021E-PDF

ISBN 978-0-660-37732-2

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Également publié en français sous le titre : Lignes directrices génériques pour la préparation d'un énoncé des incidences environnementales

Document availability

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Publishing history

May 2016 Version 1.0

March 2021 Version 2.0 *Added text using guidance from REGDOC 2.9.1 to clarify scope of factors*

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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, the CEAA 2012 and its regulations prevail. Portions of the CEAA 2012 have been paraphrased in this document, but will not be relied upon for legal purposes.

Part 1 – Background

1. Introduction

The purpose of this document is to provide information to proponents on the requirements for the preparation of an environmental impact statement (EIS) for a designated project 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 provides guidance and general instruction on the preparation of the EIS, and Part 2 outlines the information that must be included in the EIS.

Section 5 of the CEAA 2012 requires an assessment of the proposed project's potential environmental effects:

5. (1) For the purposes of this Act, the environmental effects that are to be taken into account in relation to an act or thing, a physical activity, a designated project or a project are:
 - (a) a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:
 - (i) fish and fish habitat as defined in subsection 2(1) of the [Fisheries Act](#)
 - (ii) aquatic species as defined in subsection 2(1) of the [Species at Risk Act](#)
 - (iii) migratory birds as defined in subsection 2(1) of the [Migratory Birds Convention Act, 1994](#)
 - (iv) any other component of the environment that is set out in Schedule 2
 - (b) a change that may be caused to the environment that would occur
 - (i) on federal lands
 - (ii) in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out
 - (iii) outside Canada
 - (c) with respect to Aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on
 - (i) health and socio-economic conditions
 - (ii) physical and cultural heritage
 - (iii) the current use of lands and resources for traditional purposes
 - (iv) any structure, site or thing that is of historical, archaeological paleontological or architectural significance
5. (2) However, if the carrying out of the physical activity, the designated project or the project requires a federal authority to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than this Act, the following environmental effects are also to be taken into account:
 - (a) a change, other than those referred to in paragraphs (1)(a) and (b), that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function

that would permit the carrying out, in whole or in part, of the physical activity, the designated project or the project

- (b) an effect, other than those referred to in paragraph (1)(c), of any change referred to in paragraph (a) on
 - (i) health and socio-economic conditions
 - (ii) physical and cultural heritage
 - (iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance

The Canadian Nuclear Safety Commission (CNSC) uses the proponent's EIS and other information received during the environmental assessment (EA) process to prepare an EA report that will inform the issuance of a decision statement by the Commission.

Therefore, the EIS must include a full description of the changes the project will cause to the environment that may result in potential effects on areas of federal jurisdiction (i.e., section 5 of the 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 should 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 proponent's responsibility to provide sufficient data and analyses of potential changes to the environment.

2. Guiding principles

2.1 Government of Canada's interim measures

On January 27, 2016, the Minister of Environment and Climate Change Canada and the Minister of Natural Resources Canada announced an interim approach that includes principles and plans for major projects. These principles are the first part of a broader strategy to review and restore confidence in Canada's EA processes.

In particular, the Government of Canada has introduced a principle under which direct and upstream greenhouse gas emissions linked to the projects under review will be assessed. The proponent is expected to take the necessary steps to provide sufficient information and evidence, in accordance with this principle. For more information on assessing greenhouse gas emissions, refer to section 5.1 (Part 2).

2.2 Environmental assessment as a planning tool

An environment assessment (EA) is a planning tool used to ensure that projects are considered in a careful and precautionary manner in order to avoid or mitigate possible environmental effects and to encourage decision makers to take actions that promote sustainable development.

2.3 Public participation

One of the purposes of the EA identified in the CEAA 2012 is to ensure opportunities for meaningful public participation during an EA. The CNSC ensures that the public is provided with opportunities to participate in the EA. 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.

2.4 Engagement with Indigenous groups

A key objective of the CEAA 2012 is to promote communication and cooperation with Indigenous peoples, which include the First Nations, Inuit and Métis. The proponent is expected to engage with Indigenous groups that may be affected by the project as early as possible in the project planning process. The proponent will provide Indigenous groups with opportunities to learn about the project and its potential effects, communicate their concerns about the project's potential effects and discuss measures to mitigate those effects. The proponent is strongly encouraged to work with Indigenous groups to establish an engagement approach that is reasonable to both parties. The proponent will make reasonable efforts to consider traditional Indigenous knowledge in the assessment of environmental impacts. For more information on considering Indigenous traditional knowledge, refer to section 3.3.2 (Part 1).

Information gathered through the EA process and associated engagement by the proponent with Indigenous groups will be used to inform decisions under the CEAA 2012. In providing information to the CNSC, the proponent will ensure that any confidential information shared with them by Indigenous groups is treated in the appropriate manner. This information will also contribute to the Crown's understanding of any potential adverse impacts of the project on potential or established Indigenous or treaty rights and the effectiveness of measures proposed to avoid or minimize those impacts, and will assist the Crown in meeting its duty-to-consult obligations.

The proponent is encouraged to consult the following resources:

- [REGDOC-3.2.2, *Indigenous Engagement*](#) (CNSC)
- [Aboriginal and Treaty Rights Information System](#) (Indigenous and Northern Affairs Canada)

2.5 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.

A document by Canada's Privy Council Office, *A Framework for the Application of Precaution in Science-based Decision Making About Risk*, sets out guiding principles for the application of precaution to science-based decision making.

3. Preparation and presentation of the EIS

3.1 Guidance

The proponent is encouraged to consult the CNSC's [REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures*](#) for additional guidance on the preparation of the EIS. The proponent may also consider consulting the relevant EA policy and guidance documents provided on the [Impact Assessment Agency of Canada's website](#).

The proponent is further encouraged to consult with the CNSC and, if applicable, other federal authorities, during the planning and development of the EIS and supporting documentation.

3.2 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 any residual effects. Except where specified by the CNSC, 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 the methods are transparent, justifiable and replicable.

These guidelines may include matters that the proponent does not deem relevant or significant to the project. If such matters are omitted from the EIS, the proponent will clearly indicate this and provide a justification so that the CNSC, federal authorities, Indigenous groups, the public and any other interested party have an opportunity to comment on this decision. If the CNSC disagrees with the proponent's decision, the proponent will be required to provide the specified information.

The proponent must explain and justify the methods used to predict the impacts the project will have on each valued component (VC). VCs include biophysical and socioeconomic components, the interactions among them and their relationships within the environment. The information presented must be substantiated; in particular, the proponent must describe how the VCs were identified and what methods were used to predict and assess the project's potential adverse environmental effects on these components. The value of a component not only relates to its role in the ecosystem, but also to the value that humans place on it. The culture and way of life of the people using the area affected by the project may be considered VCs themselves. The EIS will also explain and justify methods used to identify mitigation measures and follow-up program elements.

The EIS will document how scientific, engineering, traditional and local 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 and sensitivity of models used to reach conclusions must be indicated. The sections in the EIS regarding the existing environment and the potential adverse environmental effects predictions and assessment must be prepared, using best available information and methods, to the highest standards in the relevant subject area. All conclusions must be substantiated.

The EIS will identify all significant 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 traditional and local knowledge, the EIS will contain a balanced presentation of the issues and a statement of the proponent's conclusions.

3.3 Use of information

3.3.1 Federal coordination of information or knowledge

Section 20 of the 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 CNSC. The CNSC will coordinate the involvement of federal departments and other jurisdictions with expert and specialist knowledge specific to the EA and notify the proponent.

3.3.2 Community knowledge and Indigenous traditional knowledge

Subsection 19(3) of the CEAA 2012 states, “the environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge”.

The proponent will consider the community and Indigenous traditional knowledge to which it has access or that is acquired through Indigenous and public engagement activities, in keeping with appropriate ethical standards and obligations of confidentiality. Agreement should be obtained from Indigenous groups regarding the use, management and protection of their existing traditional knowledge during and after the EA.

Where community and Indigenous traditional knowledge has been considered by the proponent, the EIS will document the following:

- the traditional knowledge gathered
- how the traditional knowledge was gathered (e.g., interviews with key community leaders and elders, collaborative field research, Indigenous traditional knowledge studies, etc.)
- the source of the traditional knowledge
- how the proponent considered the traditional knowledge gathered in the assessment, including both methodology (e.g., identifying VCs, establishing spatial and temporal boundaries, defining significance criteria) and analysis (e.g., baseline characterization, effects prediction, development of mitigation measures)

3.3.3 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 the requirements of the EIS guidelines, the proponent will either include the information directly in the EIS or clearly direct readers to it (i.e., by cross-referencing). When relying on existing information, the proponent will also comment on how the data was 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.

3.3.4 Confidential information

In implementing the CEAA 2012, the CNSC is committed to promoting public participation in the EAs 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 posted or referenced on the [Canadian Impact Assessment Registry](#) (formerly the Canadian Environmental Assessment Registry) and/or the CNSC's website and made available to the public upon request. For this reason, the EIS should not contain information that:

- is sensitive or confidential (i.e., financial, commercial, scientific, technical, personal, cultural) under the *Privacy Act* and the *Access to Information Act*, is treated consistently as confidential, and the person affected has not consented to the disclosure
- may cause harm to a person or harm to the environment through its disclosure

If the EIS contains information that should be treated as confidential or protected under the *Privacy Act* and the *Access to Information Act*, the proponent should identify that information and request that the CNSC treat it accordingly.

Part 2 – Content of the Environmental Impact Statement

Part 2 of this document provides specific instructions for the content of each section in the EIS. The EIS as a whole must reflect the guiding principles in Part 1 of this document.

1. Presentation and Organization

To help identify the documents submitted, the title page of the EIS and related documents contains the following information:

- project name and location
- title of the document, including the term “environmental impact statement”
- subtitle of the document
- proponent name and contact information
- date

The EIS will be written in clear, precise language. A glossary of technical terms and a list of acronyms and abbreviations will be included. It 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 brevity and to avoid repetition, cross-referencing within the EIS is preferred. The EIS may make reference to 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 with the information requirements set out in the EIS guidelines will be provided. The proponent will provide copies of the EIS and its summary for distribution, as directed by the CNSC, including paper and electronic versions in unlocked, searchable PDF format.

2. Executive Summary

For efficiency, the proponent may consider preparing a summary of the EIS in both official languages (English and French) to be provided to the CNSC at the same time as the EIS. The proponent is also encouraged to consider making the executive summary available in the language(s) spoken by Indigenous communities in close proximity to the project (e.g., Cree, Dene).

The summary, provided as a separate document, will include:

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

- a summary of the consultation held with Indigenous groups, the public and government agencies, including a summary of the issues raised and the proponent's responses
- an overview of the key environmental effects of the project and proposed technically- and economically-feasible mitigation measures
- the proponent's conclusions on the residual environmental effects of the project after taking mitigation measures into account and the significance of those effects
- sufficient details for the reader to learn about and understand the project, its potential environmental effects, mitigation measures, the significance of the residual effects and the follow-up program

3. Introduction and Overview

3.1 About the proponent

In the EIS, the proponent will:

- provide contact information (e.g., name, address, phone, fax, email)
- identify itself and provide the name of the legal entity or entities that would develop, manage and operate the project
- describe corporate and management structures
- identify key personnel, contractors and/or sub-contractors responsible for preparing the EIS

3.2 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 part of a larger sequence of projects, the EIS will outline the larger context.

The overview identifies the key project components rather than providing a detailed description which is presented in a different section of the EIS.

3.3 Project location

The EIS will contain a description of the geographical setting in which the project will take place. This description should include those aspects of the project and its setting that are key to understanding the project's potential adverse environmental effects, including:

- geographical maps of the project location (at an appropriate scale) that includes project components, boundaries of the proposed project site with Universal Transverse Mercator (UTM) coordinates, the lease boundary, site study area, local study area, regional study area, the major existing infrastructure, adjacent land uses and any important environmental features
- current land use in the area
- the 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 (Schedule 1 of *Species at Risk Act* (SARA)) or provincially listed species at risk and other sensitive areas
- a description of local and Indigenous communities
- traditional Indigenous territories, treaty lands, and Indian reserve lands and Métis harvesting regions and/or settlements

3.4 Regulatory framework and the role of government

The EIS should identify:

- the environmental and other regulatory approvals and legislation, including the CEAA 2012, 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
- any treaty or self-government agreements with Indigenous groups that are pertinent to the project and/or EA
- any relevant land use plans, land zoning or community plans
- regional, provincial and/or national objectives, standards or guidelines that have been used by the proponent to assist in the evaluation of any predicted environmental effects

4. Project description

4.1 Purpose of the project

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

4.2 Alternative means of carrying out the project

The EIS shall identify and describe alternative means to carry out the project that are, from the perspective of the applicant, technically and economically feasible. The alternative means identified by the proponent include options for locations, development and implementation methods, routes, designs, technologies and mitigation measures. Alternative means may also be related to the construction, operation, expansion, decommissioning and abandonment of a physical work.

The approach and level of effort applied to addressing alternative means is established on a project-by-project basis, taking into consideration:

- the characteristics of the project
- the environmental effects associated with the potential alternative means
- the health or status of VCs that may be impacted by the alternative means

- the potential for mitigation and the extent to which mitigation measures may address potential environmental effects
- the level of concern expressed by the public and Indigenous groups

The EIS should also describe the environmental effects of each of the alternative means. It should list the criteria used to identify an alternative means as unacceptable and explain how these criteria are applied, as should the criteria used to examine the environmental effects of each remaining alternative means to identify the preferred alternative.

The proponent will complete the following procedural steps for addressing alternative means:

- Identify and describe in sufficient detail the alternative means to carry out the project:
 - develop criteria to determine the technical and economic feasibility of the alternative means
 - identify those alternative means that are technically and economically feasible
- Identify the effects of each technically and economically feasible alternative means:
 - identify those elements of each alternative means that could produce effects in sufficient detail to allow a comparison with the effects of the project
 - the effects referred to above include both environmental effects and potential adverse impacts on potential or established Indigenous and treaty rights and related interests
- Describe the methodology used for the analysis of alternative means and the conclusion reached (i.e., preferred means).

For further information regarding “purpose of” and “alternative means”, please consult the Impact Assessment Agency’s operational policy statement, *Addressing “Purpose of” and “Alternative Means” under the CEAA 2012* (see bibliography).

The CNSC recognizes that projects may be in the early planning stages when the EIS is being prepared. Proponents are strongly encouraged to conduct an environmental effects analysis where they have not made final decisions about the placement of project infrastructure or the technologies to be used, or if several options exist for various project components.

4.3 Scope of project

The scope of the project for the purpose of the EA includes all the phases, components, activities and federal decisions proposed by the proponent as described in the project description that has been determined to meet the requirements of the *Prescribed Information for the Description of a Designated Project Regulations*. The CNSC’s Commission may also determine that other components and/or activities in relation to the project are to be included in the project scope.

The proponent will consider all phases, components, activities and federal decisions identified in the scope of project as part of the effects assessment.

4.3.1 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.

4.3.2 Project activities

The EIS will include descriptions of each phase 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.

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 originally proposed, including the benefits of these changes to the environment, Indigenous peoples, and the public.

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

5 Scope of the environmental assessment

5.1 Factors to be considered

Scoping establishes the EA's parameters and focuses the assessment on relevant issues and concerns. The EA of the designated project must take into account the following factors, as listed in subsection 19(1) of the CEAA 2012:

- a) the section 5 environmental effects of the designated project (such as changes to fish and fish habitat, aquatic species, migratory birds), including the environmental effects of malfunctions or accidents that may occur in connection with the designated project, and any cumulative environmental effects likely to result from the designated project in combination with other physical activities that have been or will be carried out
- b) the significance of those environmental effects
- c) comments from the public that are received in accordance with the CEAA 2012
- d) mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project
- e) the requirements of the follow-up program in respect of the designated project
- f) the purpose of the designated project
- g) alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means
- h) any changes to the designated project that may be caused by the environment
- i) the results of any relevant study conducted by a committee established under section 73 or 74 of the CEAA 2012

- j) any other matter relevant to the EA that the CNSC requires to be taken into account, in accordance with the *Nuclear Safety and Control Act*

Pursuant to subsection 19(2) of the CEEA 2012, the scope of the factors to be taken into account under paragraphs 19(1)(a), (b), (d), (e), (g), (h) and (j) is determined by the CNSC, as the responsible authority.

In conjunction with subsections 4.1 and 4.4 of REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures*, the CNSC requires an environmental risk assessment (ERA) and a human health risk assessment (HHRA) as part of the EIS. An ERA is a systematic process that identifies, quantifies and characterizes the risk posed by nuclear or hazardous substances and physical stressors in the environment. The ERA:

- identifies facility- or activity-specific characteristics and site-specific environmental characteristics
- identifies interactions between those characteristics
- assesses the likelihood and significance of these interactions and the resulting potential effects on the environment and the public

An HHRA is completed as a sub-element of an ERA for both nuclear and hazardous substances.

To implement the Government of Canada's interim measure with respect to upstream greenhouse gas emissions, the CNSC may require consideration of these types of emissions in the scope of the EA. On March 19, 2016, a definition of upstream greenhouse gas (GHG) emissions was published by Environment Canada and Climate Change in the *Canada Gazette*. The proposed definition of upstream includes "all industrial activities from the point of resource extraction to the project under review." The processes to be considered as upstream activities will vary by type of resource and nature of the project being assessed. In general, upstream activities include extraction, processing, handling and transportation.

Where a reliable and feasible methodology exists for calculating upstream GHG emissions linked to the project, the proponent will be required to provide sufficient information to estimate these types of emissions. This information should be presented by individual pollutant and summarized in carbon dioxide equivalent units per year. If upstream GHG emissions are not considered in the assessment, the proponent will provide a rationale in the EIS.

5.2 Scope of factors

5.2.1 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 relates not only to its role in the ecosystem, but also to the value people place on it. For example, it may have scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

The EIS identifies the VCs linked to section 5 of the CEEA 2012, including those identified in section 9.2 (Part 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 SARA.

Under section 73 of the SARA, the Minister of Environment and Climate Change Canada may grant permits authorizing an activity affecting a listed wildlife species or any part of its residence or critical habitat that would otherwise be prohibited. Where the proponent determines that a listed wildlife species or any part of its residence or critical habitat would be affected by the project activities, it should consult directly with the Canadian Wildlife Service as early as possible in the process.

The final 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 about the environment acquired through public consultation and Indigenous engagement. The EIS will describe the methods used to predict and assess the potential adverse environmental effects the project would have 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 activities. The EIS will provide a rationale for selecting specific VCs and for excluding any VCs or information specified in these guidelines. Challenges with particular exclusions may arise, so it is important to document the information and criteria used to make each determination. Examples of justification include primary data collection, computer modelling, literature references, public consultation, expert input or professional judgement. The EIS will identify those VCs, processes and interactions that were raised as concerns during any workshop or meeting held by the proponent, or that the proponent considers will likely be affected by the project. In doing so, the EIS will indicate to whom these concerns are important and why, including environmental, Indigenous, social, economic, recreational and aesthetic considerations. If comments are received on a component that has not been included as a VC, the comments will be summarized, and the rationale for excluding the VC will be provided.

5.2.2 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 one. The proponent is encouraged to consult with the CNSC, federal and provincial government departments and agencies, local government and Indigenous groups. It is also encouraged to take into account public comments when defining the spatial boundaries used in the EIS.

The EIS will describe the spatial boundaries, including local and regional study areas, for each VC to be used to assess the potential adverse environmental effects of the project and provide a rationale for each boundary. Spatial boundaries are defined by taking into account the following criteria. This list is not exhaustive:

- a) the physical extent of the proposed project, including any off-site facilities or activities
- b) the extent of aquatic and terrestrial ecosystems potentially affected by the project
- c) the extent of potential effects arising from noise, light and atmospheric emissions
- d) the extent to which traditional land use or treaty rights could potentially be affected by the project

- e) current land and resource use for residential, commercial, industrial, recreational, cultural and aesthetic purposes by communities whose areas include the physical extent of the project
- f) the size, nature and location of past, present and reasonably foreseeable projects and activities which could interact with items (b), (c), (d) and (e)
- g) community and Indigenous traditional knowledge, and ecological and technical considerations

The following geographic study areas should serve as the basis for developing project- and effect-specific study areas:

Site study area: The site study area is the project's footprint. In other words, it is where project activities would be undertaken, and it includes the project's proposed facilities, buildings and infrastructure.

Local study area: The local study area is defined as the area that exists outside the site study area boundary, where measurable changes to the environment may be anticipated as a result of the proposed activities at any phase of the project, either through normal activities or from possible accidents or malfunctions. The boundaries must change if appropriate following an assessment of the spatial extent of potential effects. The geographic boundary depends on the factor being considered (e.g., a local study area defined for the aquatic environment will differ from that defined for the atmospheric environment).

Regional study area: The regional study area is defined as the area within which the potential effects of this project may interact with the effects of other projects, resulting in potentially cumulative effects. The geographic boundary for the regional study areas is also specific to the factor being considered.

Within these study areas, the boundary of concern will extend to a depth that will include the full extent of the surface water and groundwater.

The EA's temporal boundaries will span all phases of the project determined to be within the scope of the project, as specified in section 4.3. If impacts are predicted after project decommissioning, this should be taken into consideration when defining boundaries. At a minimum, the assessment is expected to include the period of time during which the maximum impact is predicted to occur. Community and Indigenous traditional knowledge should factor into decisions about 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.

6 Public and stakeholder consultation

In accordance with CNSC's [REGDOC-3.2.1, *Public Information and Disclosure*](#), the EIS will describe the ongoing and proposed participation activities that the proponent will undertake or that it has already undertaken on the project. It will describe the efforts made to distribute project information, and describe the information and materials that were distributed during the public 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 into the

project design and EIS. The EIS will provide a summary of the key project issues raised and their potential environmental effects, as well as describe any outstanding issues and ways to address them.

7 Indigenous engagement

In accordance with the CNSC's [REGDOC-3.2.2, *Indigenous Engagement*](#), the EIS will describe the proponent's engagement activities with potentially affected Indigenous groups.

The EIS will include, and the proponent should consider engaging with potentially affected Indigenous groups to obtain their views on the following, to be included in the EIS:

- the objectives of Indigenous engagement activities and the methods used
- each Indigenous group's potential or established rights, including geographical extent, nature, frequency, timing, maps and data sets (e.g., fish catch numbers), when this information is provided by a group to the proponent or available through public records
- comments, specific issues and concerns raised by Indigenous groups and how the key concerns were addressed
- the potential adverse impacts of the project on potential or established Indigenous or treaty rights
- the effects of changes to the environment on Indigenous 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 the CEEA 2012
- VCs suggested by Indigenous groups for inclusion in the EIS, whether they were included and the rationale for any exclusions
- measures identified to mitigate or accommodate potential adverse impacts of the project on the potential or established Indigenous or treaty rights and effects of changes to the environment for Indigenous peoples, including suggestions made by Indigenous groups

One suggested format for providing this information is a table to track the key issues raised by each Indigenous group, including concerns raised about the project, proposed mitigation options and where appropriate, a reference to the proponent's analysis in the EIS.

8 Description of the environment

8.1 Baseline environment

The EIS will include a description of the environment, including the components of the existing environment and environmental processes, their interrelations and interactions, and the variability in these components, processes and interactions over time scales appropriate to the EIS. In characterizing the environmental effects of the project, the proponent will consider the current baseline environment and environmental trends

within the project area. The description of the existing baseline and environmental trends should consider past projects and activities carried out by the proponent and/or others in the project area.

Based on the scope of the project, the EIS will present sufficiently detailed baseline information to determine the effects the project could have on the VCs and analyze those effects. If other VCs are identified while conducting the EA, the baseline condition for these components will also be described in the EIS. The baseline description should include results from studies done prior to any physical disruption of the environment due to initial project activities (e.g., site preparation). To determine the appropriate spatial boundaries to describe the baseline information, refer to section 5.2.2 (Part 2) of these guidelines. As a minimum, the EIS will include a description of the following biophysical and human (health/socio-economic) environmental components.

8.2 Atmospheric environment

The atmospheric environment includes the climate conditions at the site and in the local and regional study areas. It includes the seasonal variations in weather conditions in the study areas to allow the assessment of effects on the facility or activity.

The applicant or licensee should provide a description of the existing ambient air quality in the study areas, with emphasis on characterizing radiological and non-radiological analytes.

The description should include meteorological information, such as air temperature, relative humidity, precipitation, wind speed and direction, atmospheric pressure and solar radiation. It should also include the occurrence of weather phenomena (e.g., lightning, temperature inversions, fog). Special consideration should be given to analyzing extreme and rare meteorological phenomena (e.g., tornadoes). Uncertainties should be described and taken into account when discussing the reliability of the information presented.

The description should also include current ambient daytime and nighttime noise levels at the site and local study areas, and include information about its source(s), geographic extent and temporal variations. The description should provide ambient noise levels for other areas that could be affected by the facility or activity. Some examples are:

- increased traffic along transportation corridors to and from the site during construction
- receptors at residences and sensitive sites (such as hospitals, schools, daycare facilities, seniors' residences and places of worship)

The applicant or licensee should describe the influence of regional topography or other features that could affect weather conditions in the study areas.

The baseline information should be sufficient to support the use of an atmospheric dispersion model to conduct a site-specific ERA and to support an assessment of environmental effects on the project (e.g., tornadoes).

8.3 Surface water environment

The surface water environment includes all surface water features and hydrology that affect surface water at the site or in the local and regional study areas. The applicant or licensee should include delineation of drainage basins at appropriate scales.

When documenting the water quality of all surface water, the applicant or licensee should demonstrate the use of appropriate sampling and analytical protocols for the range of analytical parameters that could potentially be influenced by the facility or activity. This information should be presented using tables, maps and figures to provide an understanding of surface water characteristics and conditions at the site and in the local and regional study areas.

The applicant or licensee should describe hydrological regimes within the drainage basin, including seasonal fluctuations and the year-to-year variability of all surface waters. The applicant or licensee should assess the normal flow, flooding and drought properties of water bodies, as well as the interactions between surface water and groundwater flow systems. The applicant or licensee should describe all water sources used for drinking water in the area, including source water intakes for drinking water treatment facilities.

The baseline information should be sufficient to support the use of an aquatic dispersion model to conduct a site-specific ERA and to support an assessment of the effects (e.g., flooding) of the environment for the facility or activity.

The applicant or licensee should document the sediment quality of all water bodies to be affected by the facility or activity and demonstrate the use of appropriate sampling and analytical protocols for the range of analytical parameters with the potential to be influenced by the facility or activity. This information should provide an appropriate understanding of sediment characteristics and conditions on the site and in the local and regional study areas.

The study design should be fully described, including the allocation of samples in space and time, measurement methods and results.

The applicant or licensee should include an assessment of any limitations or gaps in the quality and extent of baseline data and methods, as well as the method(s) by which they have been addressed.

8.4 Aquatic environment

The aquatic environment includes the aquatic and wetland species at the site and within the local and regional study areas, including the flora and fauna and their habitats.

The applicant or licensee should seek information from relevant authorities (e.g., Environment and Climate Change Canada, Fisheries and Oceans Canada and provincial or territorial authorities) on aquatic and wetland species and habitat for the local and regional study areas. The applicant or licensee should also undertake independent studies to gather the necessary information.

The applicant or licensee should include a description of the food chain and food web dynamics as a habitat component, as this relates to fish populations, and the potential effects (e.g., impingement and entrainment) the facility or activity will have.

The applicant or licensee should provide detailed habitat mapping that demonstrates habitat usage by fish within the study areas. This information should include depth profiles, substrate mapping, water temperature profiles and a description of known and potential habitat usage (e.g., spawning, nursery, rearing, feeding and migration) by fish in the study areas.

The applicant or licensee should identify any biological species that have natural conservation status – in other words, that are deemed rare, vulnerable, endangered, threatened or uncommon at a federal, provincial or municipal level – and their critical habitats, if any are identified.

The applicant or licensee should provide baseline characterization of radionuclide and hazardous substance levels in aquatic biota to support human and ecological risk assessments.

The applicant or licensee should fully describe the study design, including the allocation of samples in space and time, measurement methods and results.

The applicant or licensee should include an assessment of any limitations or gaps in the quality and extent of baseline data and methods, as well as the method(s) by which they have been addressed.

8.5 Geological and hydrogeological environment

The geological and hydrogeological environment includes the bedrock and overburden geology at both the local and regional scales.

8.5.1 Geology

The applicant or licensee should characterize the geomorphology, topography, quaternary geology and soil characteristics, structural geology, petrology, geochemistry, economic geology and hydrogeology. The applicant or licensee should also describe the geomechanical properties that apply to the region and at the site that will be disturbed.

The applicant or licensee should provide the geotechnical properties of the overburden, including shear strength and liquefaction potential, to allow for the assessment of slope stability and the bearing capacity of foundations under both static and dynamic conditions.

The description of the structural geology should include regional, local and site-specific documentation of fractures and faults. It should include a description of primary geological features and deformation fabrics, both at the site and in the local and regional study areas.

If applicable, the applicant or licensee should describe the coastal geomorphology and include the characteristics of any lakefront, ocean bluff or shoreline, and both near-shore and offshore zones.

The baseline characterization should be sufficient to assess the effects of the environment on the facility or activity (e.g., seismic effects).

The applicant or licensee should present a geological model that incorporates all overburden and bedrock information. If extrapolation is required to derive the

stratigraphy, the applicant or licensee should explicitly discuss the uncertainties and the need for additional field investigations to reduce those uncertainties.

The applicant or licensee should describe the geotechnical and geophysical hazards, including consideration of subsidence, uplift, seismicity (and active faulting), and it should consider the potential for movement at the ground surface (including co-seismic rupture) and earthquake ground motions. A seismic hazard assessment should be provided. Where appropriate, narrative descriptions should be supplemented by geological maps, figures, cross-sections, borehole logs and photographs (with specific location information).

8.5.2 Hydrogeology

The applicant or licensee should describe the hydrogeology at the site and in the local and regional study areas. The description should characterize the physical and geochemical properties of all overburden and bedrock hydrogeological units (from the ground surface to the uppermost basement unit, which is site dependent).

Units may be characterized as aquifers or aquitards, and unit descriptions should include their geochemical characteristics, vertical and lateral permeabilities, transport mechanism (diffusion versus advection) and the directions of groundwater flow.

The applicant or licensee should identify the groundwater recharge and discharge areas, and describe in detail groundwater interactions with surface waters.

The applicant or licensee should present a conceptual and numerical hydrogeological model that discusses the hydrostratigraphy and groundwater flow systems.

The applicant or licensee should provide a description of baseline groundwater quality at the site and in the local study area. The applicant or licensee should also describe local and regional potable groundwater supplies, including their current use and potential for future use.

8.6 Terrestrial environment

The terrestrial environment includes flora and fauna, their habitats, any wildlife corridors and the soil.

The applicant or licensee should describe the terrestrial species at the site and within the local and regional study areas, including flora, fauna and their habitat. The applicant or licensee should identify all biological species at risk (i.e., endangered, threatened, special concern, extirpated at a federal, provincial or municipal level) known to occur in the area or where the site is within range of the species.

The applicant or licensee should describe the presence and importance of wildlife habitat within the study areas, including critical habitats for any listed species. The applicant or licensee should also describe any wildlife corridors and physical barriers to movement.

The applicant or licensee should identify all protected and conservation areas established by federal, provincial and municipal jurisdictions (e.g., wilderness areas, parks, sites of historical or ecological significance, nature reserves, federal migratory bird sanctuaries and wildlife management areas).

The applicant or licensee should describe the existing soil quality (including hazardous and radiological substance concentrations) for all study areas, as well as any additional soil quality parameters potentially relevant for modelling purposes (such as the transport and bioavailability of contaminants of potential concern).

The applicant or licensee should provide baseline a characterization of radionuclide and hazardous substance levels in vegetation and other non-human biota to support human and ecological risk assessments. The characterization should also take into consideration the baseline conditions of other applicable environmental components (e.g., the atmospheric environment).

The applicant or licensee should undertake independent studies to gather the necessary information, as appropriate. The applicant or licensee should describe field studies in terms of representativeness of the target populations where possible. The applicant or licensee should fully describe the design of the study, including the allocation of samples in space and time, measurement methods and results.

The applicant or licensee should include an assessment of any limitations or gaps in the quality and extent of baseline data and methods, and the method(s) by which they were addressed.

8.7 Ambient radioactivity

Ambient radioactivity arises from sources, their activity levels and their origin, for all applicable environmental media (including air, soil, food, water, aquatic sediments and plant or animal tissue).

The applicant or licensee should describe the ambient radiological conditions at the site and in the local and regional study areas. The applicant or licensee should include information about the existing conditions, including an inventory of sources, their activity levels and their origin (natural or anthropogenic), for all applicable environmental media.

The applicant or licensee should fully describe the design of the study, including the allocation of samples in space and time, measurement methods and results.

The description should include an assessment of any limitations or gaps in the quality and extent of the baseline data and methods, as well as the method(s) by which they have been addressed.

8.8 Human health

The potential effects of the facility or activity on human health include both radiological sources and non-radiological contaminants.

The applicant or licensee should describe the current health profiles of the communities likely to be affected by the facility or activity, including information on the population health of the communities in the local and regional study areas.

The applicant or licensee should provide, to the extent available, information about the current consumption of locally grown harvests and country foods, and the quality by food type, amounts consumed and parts consumed (whole body or specific organs).

The applicant should characterize the socio-economic environment, including:

- the rural and urban settings likely to be affected by the project
- any federal lands and lands located outside the province or Canada that may be affected by the project
- the current use of land in the study area, with 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 to any permanent, seasonal or temporary residences or camps
- health¹ and socio-economic conditions, covering the functioning and health of the socio-economic environment and encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities
- physical and cultural heritage, including structures, sites or things of historical, archaeological, paleontological or architectural significance

8.9 Indigenous land and resource use

Indigenous land and resource use includes lands, waters and resources of specific value, traditional activities and lifestyle, and traditional dietary habits.

Traditional land use may include areas where traditional activities are being carried out, such as establishing seasonal camps, camping, travel on traditional routes, gathering of country foods and medicines (hunting, fishing, trapping, planting and harvesting).

Traditional land use also includes spiritual sites of significance to Indigenous people.

The applicant or licensee should identify the lands, water and resources of specific social, economic, archaeological, cultural or spiritual value to Indigenous people, including established and asserted Indigenous or treaty rights that may be affected by the facility or activity.

The applicant or licensee should describe Indigenous land and resource use at the site and in the local and regional study areas. The applicant or licensee should identify traditional activities, including activities for food, social, ceremonial and other cultural purposes, in relation to such lands, waters and resources with a focus on the current use of lands, waters and resources for traditional purposes.

The applicant or licensee should describe the traditional dietary habits and dependence on country foods and harvesting for other purposes, including harvesting of plants for medicinal purposes. The analysis should focus on identifying the potential adverse effects of the facility or activity that impact the ability of future generations of Indigenous people to pursue traditional activities or lifestyle.

¹ The proponent should refer to Health Canada's guidance documents in order to include the appropriate baseline information relevant to human health.

9 Effects assessment

9.1 Predicted changes to the physical environment

The assessment will include a consideration of the predicted changes to the environment that result from the project being carried out or from of any powers, duties or functions 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 (i.e., construction, operation, decommissioning) and are to be described in terms of magnitude, geographic extent, duration and frequency, and whether the environmental changes are reversible or irreversible.

As changes to various parts of the physical environment may be inter-related in an ecosystem, the EIS will explain and describe the connections between the changes described.

9.2 Predicted effects on valued components

Based on the predicted changes to the environment identified in section 9.1 (Part 2), the proponent is to assess the environmental effects of the project on the VCs identified as per section 5.2.1 (Part 2).

Based on the predicted changes to the environment identified in section 9.1 (Part 2), additional VCs are to be selected based on the following:

- If there is potential for the project to result in environmental changes on federal lands, in another province or in another country, VCs of importance not already identified are to be listed in this section.
- If federal decisions about the project will lead to environmental changes, these environmental changes are to be considered stand-alone VCs.

All interconnections between VCs and between changes to multiple VCs will be described.

The proponent will use the information in appendix C of the CNSC's REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures* and CEAA 2012 guidance documents listed on the Impact Assessment Agency's website for guidance on assessing the environmental effects of the project (refer to the bibliography for titles and web pages).

9.3 Mitigation measures

Every EA conducted under the CEAA 2012 will consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project. Measures that are technically and economically feasible include application of best industry practices, pollution prevention principles such as best available technology and techniques economically achievable, and radiation protection principles, such as keeping radiation exposure and doses as low as reasonably achievable (ALARA). Under the CEAA 2012, mitigation includes measures to eliminate, reduce or control the adverse environmental effects of a project, as well as restitution for damages to the environment through replacement, restoration, compensation or other means.

Each measure 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 based on the avoidance and reduction of the effect(s) 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 (including the measures directed at mitigating adverse socio-economic effects). The EIS will then 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 SARA. These mitigation measures will be consistent with any SARA permit, applicable recovery strategy and/or action plan.

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 potential adverse effects. The impact statement will also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. The basis used to determine whether the mitigation measure reduces the significance of a potential 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.

For proposed mitigation measures for which there is little experience or that have questionable effectiveness, the potential environmental risks and effects – 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 and management, and how they are integrated into the follow-up program.

The EIS will document specific suggestions raised by Indigenous groups for mitigating the effects of changes to the environment on Indigenous peoples (section 5(1)(c) of CEAA 2012). For the mitigation measures intended to address the effects of changes to the environment for Indigenous peoples, the proponent must discuss the residual effects with the Indigenous groups prior to submitting the EIS.

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

9.4 Other effects to consider

9.4.1 Accidents and malfunctions

The applicant should provide an assessment of potential health and environmental effects resulting from postulated radiological and conventional malfunctions or accidents. The EIS should also include any mitigation measures, such as monitoring, contingency, clean-up or restoration work in the surrounding environment that would be required during or immediately following the postulated malfunction and accident scenarios.

The EIS should provide a description of postulated malfunction and accident sequences leading to a radiological or non-radiological release considering, as appropriate, internal events, external events and human-induced events, including their frequency, an explanation of how these events were identified and any modeling that was performed.

The applicant can use a bounding approach or use facility- or activity-specific information (e.g., design, operation, projected environmental releases) in the assessment of radiological accidents and malfunctions. If a bounding approach is used, the applicant should provide a detailed rationale for the selection of each bounding scenario.

The EIS should include the source, quantity, mechanism, pathway, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment during the postulated malfunctions and accidents.

Note: Malfunctions and accidents are reviewed in depth under the NSCA for licensing purposes (for example, under REGDOC-2.4.1, *Deterministic Safety Analysis*; REGDOC-2.4.2, *Probabilistic Safety Assessments for Nuclear Power Plants* and REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*). These scenarios should be taken into consideration by the applicant when designing environmental protection measures.

If applicable, the applicant should use operating experience (OPEX) to identify any past abnormal operations, accidents and spills to the extent that they are relevant to the current assessment for the purposes of identifying malfunction and accident scenarios to be assessed.

9.4.2 Effects of the environment on the project

The EIS shall take into account how the environment could adversely affect the project and how this in turn could result in effects on the project (e.g., extreme environmental

conditions resulting in malfunctions and accidental events). These events will be considered in different probability patterns (e.g., 5-year flood vs. 100-year flood).

Examples include local conditions, natural hazards (e.g., severe and/or extreme weather conditions), external events (e.g., flooding, drought, ice jams, landslides, avalanches, erosion, subsidence, fire, outflow conditions, geotechnical hazards, seismic events) and biophysical hazards (e.g., algae).

The applicant shall also take into account any potential effects of climate change on the project, including an assessment of whether the project might be sensitive to changes in climate conditions during its lifecycle.

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

9.4.3 Cumulative effects

The applicant shall assess any residual adverse environmental effects of the project in combination with other past, present or reasonably foreseeable projects and/or activities within the study area.

The applicant should explain the approach and methods used to identify and assess cumulative effects. The approach and methods should be consistent with *Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (see Bibliography).

10 Conclusion on significance of residual effects

The applicant shall assess the significance of any residual effects that persist, taking into consideration the proposed mitigation measures. These residual effects are identified during the ERA or a characterization of the environmental effects.

In the EIS, the applicant should include a detailed analysis of the significance of each residual effect. The applicant should clearly explain the method and definitions used to describe the level of the residual adverse effect (e.g., low, medium, high) for each of the criteria assessed. The applicant should also describe any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried on. It should also describe how these levels were combined to reach an overall conclusion on the significance of the adverse effects for each VC.

Some specific criteria to be assessed are:

- magnitude of the effect
- spatial extent of the effect
- duration and frequency of the effect
- degree to which the effect can be reversed or mitigated
- ecological importance

The method used to describe the level of the adverse effect should be transparent and reproducible.

The EIS should identify additional criteria used to assign significance ratings to any predicted adverse effects. It should contain clear and sufficient information to enable the CNSC and the public to understand and review the applicant's judgment of the significance of effects. The applicant should define the terms used to describe the level of significance. In assessing significance against the criteria, the EIS should, where possible, employ relevant existing regulatory documents, environmental standards, guidelines or objectives such as prescribed maximum levels of emissions or discharges of specific hazardous substances into the environment or maximum acceptable levels of specific hazardous substances in the environment.

11 Follow-up program

The EIS shall include a framework or preliminary program upon which EA follow-up actions will be managed throughout the life of the project.

The applicant should design the follow-up program to verify the accuracy of the EA predictions and to determine the effectiveness of the measures implemented to mitigate the potential adverse environmental effects of the project. The applicant should also design the follow-up program to incorporate pre-project information that would provide the baseline data; compliance data, such as established environmental quality criteria; regulatory documents, standards or guidelines; and real-time data consisting of observed data gathered in the field. The applicant should describe the compliance reporting methods to be used, including reporting frequency, methods and format.

Where applicable, the proponent will describe how the follow-up program relates to the project's environmental protection plan and environmental management system.

Environmental assessment effects predictions, assumptions and mitigation actions that are to be tested in the follow-up program must be converted into field-testable monitoring objectives. The monitoring design must include a statistical evaluation of the adequacy of existing baseline data to provide a benchmark for testing project effects, and the need for any additional pre-construction or pre-operational monitoring to establish a firmer project baseline.

The proponent will propose a schedule for the follow-up program. The schedule should indicate the timing, frequency and duration of effect monitoring. This schedule would be developed after the statistical evaluation of the length of time needed to detect effects given estimated baseline variability, probable environmental effect size and desired level of statistical confidence in the results (type 1 and type 2 errors).

The description of the follow-up program must include any contingency procedures or plans or other adaptive management provisions as a means of addressing unforeseen effects or correcting exceedances, as required, to comply with benchmarks, regulatory standards or guidelines.

The follow-up program will describe roles and responsibilities for the program and its review process, by both peers and the public.

The EIS should provide discussion on the follow-up program's requirements, and include:

- objectives and structure of the follow-up program and the VCs targeted by the program

- tabular summary and explanatory text of the main components of the program including:
 - a description of each monitoring activity under that component
 - which of the two generic program objectives the activity is relevant to (e.g., verify EA predictions, determine effectiveness of mitigation measures)
 - the specific statement from the EA that goes along with that generic objective and will be the focus for that activity (e.g., program objective: verify predicted effects; environmental assessment effect: no potential adverse effects)
 - the specific monitoring objective for that activity
 - planned schedule
- roles and responsibilities to be played by the proponent, regulatory agencies, Indigenous people, local and regional organizations and others in the design, implementation and evaluation of the program results
- possible involvement of independent researchers
- program funding sources
- information management and reporting (reporting frequency, methods and format)
- possible opportunities for the proponent to include the participation of the public and Indigenous groups, during the development and implementation of the program

The follow-up program plan should be sufficiently described in the EIS to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them) and confirm the effectiveness of mitigation measures.

Acronyms

ALARA	As Low As Reasonably Achievable
BATEA	As best available technology and techniques economically achievable
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
CNSC	Canadian Nuclear Safety Commission
EA	environmental assessment
EIS	environmental impact statement
ERA	environmental risk assessment
GHG	greenhouse gas
HHRA	human health risk assessment
OPEX	Operating Experience
SARA	<i>Species at Risk Act</i>
UTM	Universal Transverse Mercator
VC	valued component

Bibliography

Canadian Nuclear Safety Commission. REGDOC-2.9.1, *Environmental Protection: Environmental Policy, Assessments and Protection Measures*, September 2020, <http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-9-1-new/index.cfm>

Canadian Nuclear Safety Commission. REGDOC-3.2.1, *Public Information and Disclosure*, May 2018, <http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc3-2-1/index.cfm>

Canadian Nuclear Safety Commission. REGDOC-3.2.2, *Indigenous Engagement*, February 2016, https://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/REGDOC-3-2-2-Aboriginal-Engagement-version-1.1-eng.pdf

Canada Privy Council Office. *A Framework for the Application of Precaution in Science-based Decision Making about Risk*. ISBN 0-662-67486-3 Cat.no. CP22-70/2003.

Impact Assessment Agency of Canada (formerly Canadian Environmental Assessment Agency). Various guidance documents.

Operational policy statements:

- [Assessing cumulative environmental effects under CEAA 2012](#)
- [Addressing “purpose of” and “alternative means” under CEAA 2012](#)
- [Determining whether a designated project is Likely to cause significant adverse environmental effects under CEAA 2012](#)

Technical guidance:

- [Assessing cumulative environmental effects under CEAA 2012](#)
- [Determining whether a designated project is likely to cause significant adverse environmental effects under CEAA 2012](#)
- [Guide to preparing a description of a designated project under CEAA 2012](#)
- [Technical guidance for assessing physical and cultural heritage or any structure, site or thing that is of historical, archeological, paleontological or architectural significance under CEAA 2012](#)
- [Technical guidance for assessing the current use of lands and resources for traditional purposes under CEAA 2012](#)

Indigenous and Northern Affairs Canada. Aboriginal and Treaty Rights Information System, https://sidait-atris.aadnc-aandc.gc.ca/atris_online/home-accueil.aspx