

Draft Environmental Assessment Guidelines for (Scope of Project and Assessment)

Environmental Assessment of the Proposal by Cameco Corporation for the Redevelopment of its Port Hope Conversion Facility (Vision 2010)Port Hope, Ontario

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Draft Environmental Assessment Guidelines

TABLE OF CONTENTS

1	INTRODUCTION	- 2 -
1.1	Purpose of the Proposed Environmental Assessment Guidelines.....	- 2 -
1.2	Environmental Assessment Process.....	- 2 -
1.3	Project Background.....	- 4 -
1.4	Application of the <i>Canadian Environmental Assessment Act</i>	- 4 -
1.5	Federal and Provincial Coordination	- 5 -
1.6	Delegation of Assessment Studies to Cameco.....	- 5 -
2	SCOPE OF THE ENVIRONMENTAL ASSESSMENT	- 6 -
2.1	Scope of the Project	- 6 -
2.2	Scope of the Assessment.....	- 11 -
2.2.1	Factors to be Considered in the Comprehensive Study	- 11 -
2.2.2	Scope of the Factors to be Assessed	- 12 -
3	STRUCTURE OF THE COMPREHENSIVE STUDY REPORT	- 12 -
3.1	Executive summary.....	- 13 -
3.2	Introduction.....	- 13 -
3.3	Purpose of the Project	- 14 -
3.4	Need for the Project	- 14 -
3.5	Project Description.....	- 14 -
3.6	Alternative Means of Carrying Out the Project	- 16 -
3.7	Public Consultation Program	- 16 -
3.8	Description of the Existing Environment	- 17 -
3.9	Prediction of Environmental Effects of the Project	- 18 -
3.9.1	Description of the Assessment Methodology	- 18 -
3.9.2	Spatial and Temporal Boundaries of Assessment.....	- 18 -
3.9.3	Assessment of Effects Caused by the Project on the Environment	- 19 -
3.9.4	Assessment of Effects of the Environment on the Project.....	- 21 -
3.9.5	Assessment of the Effects on the Capacity of Renewable and Non-Renewable Resources.....	- 21 -
3.9.6	Assessment of Potential Malfunctions and Accidents	- 21 -
3.9.7	Assessment of Cumulative Effects	- 21 -
3.10	Determination of Significance	- 22 -
3.11	Follow-up Program	- 22 -
4	PUBLIC PARTICIPATION IN THE FEDERAL ENVIRONMENTAL ASSESSMENT	- 23 -
4.1	Invitation for Public to Comment on this Scoping Document.....	- 23 -
4.2	Public Consultation on the Comprehensive Study Report.....	- 23 -
4.3	Public Registry.....	- 24 -
4.4	Contact for Assessment.....	- 24 -
5	REFERENCE(S).....	- 25 -
	Appendix A – Preliminary List of Proposed Valued Ecosystem Components (VECs).....	- 26 -
	Appendix B – Preliminary Proposed Interaction Matrix.....	- 30 -

1 INTRODUCTION

1.1 Purpose of the Proposed Environmental Assessment Guidelines

The purpose of this guidelines document is to provide guidance on the environmental assessment (EA) to be conducted as a result of the proposal by Cameco Corporation (Cameco) to implement the “Port Hope Conversion Facility Vision 2010” project (Vision 2010 Project) in Port Hope, Ontario.

This draft EA Guidelines document is being released for a comment period, to provide an opportunity for the public to comment on the proposed scope of project, factors to be considered, the scope of those factors and ability of the comprehensive study to address issues related to the project.

A federal EA of the proposed project is required under the provisions of the *Canadian Environmental Assessment Act* (CEAA). Under the CEAA, the scope of the project, the factors to be considered and the scope of the factors included in the assessment are to be determined by the Responsible Authority (RA) which, in this case, is the Canadian Nuclear Safety Commission (CNSC).

The draft guidelines document describes the basis for the conduct of the EA, and focuses the assessment on relevant issues and concerns. The document also provides specific direction to the proponent, Cameco, on how to document the technical EA study, which will be delegated to it by the CNSC pursuant to subsection 17(1) of the CEAA. The document indicates the necessary information to be submitted by Cameco to the CNSC to facilitate the development of the EA Comprehensive Study Report by the CNSC. In addition, this document provides a means of communicating the EA process to stakeholders.

1.2 Environmental Assessment Process

The key next steps to be followed by the CNSC during the EA process are:

- determination of the application of the CEAA to the project, including application of the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*; establishment of the Canadian Environmental Assessment Public Registry; and stakeholder notification; (step already completed)
- preparation of a draft Environmental Assessment Guidelines document and distribution to the proponent, federal and provincial authorities and the public; (step already completed)
- receipt of comments from federal and provincial authorities and the public;
- CNSC review and disposition of comments received; and
- revision of the draft EA Guidelines.

Following the public consultation associated with this document as described in Section 4 of this document and pursuant to Subsection 21(2) of the CEAA, as the RA, the CNSC must provide a report to the Minister of the Environment (the Minister). The report from the RA to the Minister must include:

- the scope of the project, the factors to be considered in the EA and the scope of those factors (i.e. the final EA Guidelines document);
- public concerns in relation to the project;
- the potential of the project to cause adverse environmental effects; and
- the ability of the Comprehensive Study to address issues relating to the project.

The CNSC must also recommend to the Minister whether the EA should be continued by means of a Comprehensive Study, or whether the project should be referred to a mediator or review panel. After considering the RA's report and recommendation, the Minister will decide whether to refer the project back to the RA so that it may continue the Comprehensive Study process, or refer the project to a mediator or review panel. If the Minister refers the project to a mediator or review panel, the project would no longer be subject to the Comprehensive Study process under the CEAA. The Minister, after consulting the RA and other appropriate parties, would set the terms of reference for the review, and appoint the mediator or review panel members.

If the Minister does not refer the project to a mediator or review panel, the project will go back to the RA to continue the Comprehensive Study process. As a result, the project cannot be referred to a mediator or review panel in the future.

Whether the EA proceeds by means of a comprehensive study or is referred to a mediator or review panel, participant funding will be made available by the CEA Agency to facilitate public participation.

If the Minister refers the project back to the CNSC to continue the Comprehensive Study, the subsequent steps in the process are:

- issuance of the EA Guidelines by the CNSC and delegation of technical studies and some public consultation to Cameco;
- receipt of the technical studies in the form of a draft Environmental Impact Statement (EIS) document from Cameco;
- distribution of the draft EIS to the review team (CNSC, federal authorities) for comment; revision and resubmission by the proponent of the EIS, as appropriate;
- preparation of a draft Comprehensive Study Report by the CNSC, in consultation with other federal departments involved in the assessment;
- public review and comment on the draft Comprehensive Study Report;
- review and disposition of public comments by the CNSC, and completion of the Comprehensive Study Report;
- submission of the final Comprehensive Study Report to the CEA Agency by the CNSC;
- public consultation on the final Comprehensive Study Report and review and consideration of comments received; and
- EA decision statement on the Comprehensive Study Report by the Minister.

The Comprehensive Study Report would present a conclusion by the CNSC as to whether the project is likely to cause significant adverse environmental effects, taking into account the appropriate mitigation measures. The CNSC would make recommendations to the Minister on making decisions on the EA and project-related public concerns, consistent with section 23 of the CEAA. The Minister would then render an EA decision statement on the Comprehensive Study Report. If the Minister concludes that the project is not likely to cause significant adverse environmental effects, taking into account the appropriate mitigation measures, then the project would be referred back to the CNSC for an appropriate course of action under section 37 of the CEAA. Following a decision on the course of action, the CNSC may proceed with licensing hearings and decisions on licensing applications by Cameco to carry out the Vision 2010 project activities.

1.3 Project Background

In a letter dated June 22, 2006, (Reference 1), Cameco submitted its Vision 2010 proposal with a description of the project. The project consists of removing of a number of old or underutilized buildings; removing contaminated soils, building materials and stored historic wastes; transporting those soils and wastes to storage and disposal sites; and constructing new replacement buildings at the PHCF with necessary landscaping. The project is proposed to be carried out in conjunction with the Port Hope Area Initiative (PHAI) project, a joint federal-municipal government undertaking for the cleanup and long-term management of low-level radioactive and industrial waste in the Municipality of Port Hope, Ontario.

1.4 Application of the *Canadian Environmental Assessment Act*

CNSC staff have determined, pursuant to section 5(1)(d) of the CEAA, that a federal EA is required before the CNSC can authorize Cameco to proceed with activities involved with the Vision 2010 redevelopment proposal.

The proposal includes the decommissioning and demolition of several buildings, three of which are or were Class 1B nuclear facilities; remediation and restoration of these sites; construction of new buildings and operation of those facilities; and additions to existing buildings. These works constitute undertakings in relation to a physical work and, as such, there is a “project” as defined under Section 2 of the CEAA.

The CNSC is a federal authority as defined in the CEAA. Paragraph 5(1)(d) of the CEAA requires that an EA be conducted before a federal authority exercises a regulatory power or duty prescribed in the *Law List Regulations* established under the CEAA. The CNSC issues licences for activities involved in Cameco’s proposal under the authority of Subsection 24(2) of the *Nuclear Safety and Control Act* (NSCA), which is prescribed on the *Law List Regulations*. Therefore, there is a “trigger” for an EA. There are no identified exclusions from the EA for this project, pursuant to Section 7 of the CEAA and the *Exclusion List Regulations* established under the CEAA.

Accordingly, CNSC authorization of the proposed project would require that a federal EA be conducted in accordance with the provisions of the CEAA. The CNSC is an RA for the project as defined under the CEAA.

The North UO₂/Waste Recovery Building (Building #2), Metals Plant (Building #5C) and East UF₆ (Building #27) are or were Class 1B nuclear facilities for the refining or conversion of uranium with uranium production capacities of more than 100 t/a.

Subsection 19(c) of the *Comprehensive Study List Regulations* established under the CEAA states the following:

19. The proposed construction, decommissioning or abandonment, or an expansion that would result in an increase in production capacity of more than 35 per cent of,

....

c) a Class 1B nuclear facility for the refining or conversion of uranium that has a uranium production capacity of more than 100 t/a.

Therefore, the decommissioning activities of the project would be captured under subsection 19(c) of the *Comprehensive Study List Regulations* and a Comprehensive Study for the project is required and pursuant to Section 21 of the CEAA. The CNSC must ensure that a Comprehensive Study of the project is initiated, and that a report be provided to the Minister.

At this time, CNSC staff has not identified issues associated with this project which would suggest a need for it to be referred to a mediator or review panel pursuant to Section 25 of the CEAA.

1.5 Federal and Provincial Coordination

The CNSC is the only RA under the CEAA identified for this Comprehensive Study.

Through application of the *CEAA Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*, Natural Resources Canada, Environment Canada, Health Canada, Transport Canada and the Department of Fisheries and Oceans (Fish Habitat Management) have been identified as Federal Authorities for the purpose of providing expert assistance to the CNSC during the EA.

CNSC staff has also received confirmation from the Ontario Ministry of the Environment that there are no provincial EA requirements under the Ontario *Environmental Assessment Act* that are applicable to this proposal.

The CEA Agency is the Federal Environmental Assessment Coordinator (FEAC) as this project is of the type identified on the *Comprehensive Study List Regulations*. The role of the FEAC is to coordinate the participation of federal authorities in the EA process and to facilitate communication and cooperation among them.

1.6 Delegation of Assessment Studies to Cameco

Based on authority given to an RA in subsection 17(1) of the CEAA, the CNSC will delegate to Cameco the conduct of technical support studies for the EA, the development and implementation of a public consultation program, and the preparation of an EIS document. Cameco's public consultation program, in the context of this EA, would include requirements for information about

the project and the results of technical studies.

Should the project continue as a Comprehensive Study and not be referred to a mediator or review panel, Cameco would submit its EIS and technical support studies to the CNSC. The CNSC, in conjunction with the CEA Agency, would distribute the EIS and supporting documentation to Federal Authorities and the appropriate provincial authorities for review and comment. Based on comments received, the CNSC may request that the proponent revise its EIS. Following formal acceptance of the EIS by the CNSC, the FEAC and all Federal Authorities, the CNSC would use the information and analysis in the accepted EIS to prepare a draft Comprehensive Study Report. The draft Comprehensive Study Report would be made available for review and comment by the public and by Federal Authorities. The CNSC would then consider the comments received on the draft Comprehensive Study Report, make revisions as appropriate and then submit the revised Comprehensive Study Report to the CEA Agency for consideration and decision by the Minister.

2 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope of the environmental assessment includes the scope of the project, the factors to be considered in the environmental assessment and the scope of those factors.

2.1 Scope of the Project

In establishing the scope of a project for a Comprehensive Study EA under the CEAA, the physical works that are involved in the proposal and any specific undertaking that would be carried out in relation to those physical works must be determined.

Cameco's Vision 2010 project is comprised of the following concurrent major activities:

- decommissioning and demolition of buildings currently on the site (see Table 1)
- site remediation and restoration; and,
- construction of new buildings, additions to existing buildings, and related infrastructure (see Table 2).

The proposed activities would require either amendments to Cameco's existing Fuel Facility Operating Licence (FFOL) FFOL-3631.0/2012 in respect of the decommissioning and construction components of the project, or an amendment to the current FFOL and the issuance of a new licence to decommission, which would be issued pursuant to subsection 24(2) of the NSCA.

The principal project is proposed as the decommissioning of buildings designated as Class 1B Nuclear Facilities under the NSCA used for refining or converting uranium, and the construction of new buildings. Other undertakings in relation to these physical works to be considered in this environmental assessment include the demolition of several existing buildings (a preliminary list indicated in Table 1) and the construction and operation of proposed new buildings and infrastructure (Table 2). Figure 2.1 illustrates the existing site and the location of buildings that are proposed for decommissioning and demolition as part of the Vision 2010 project.

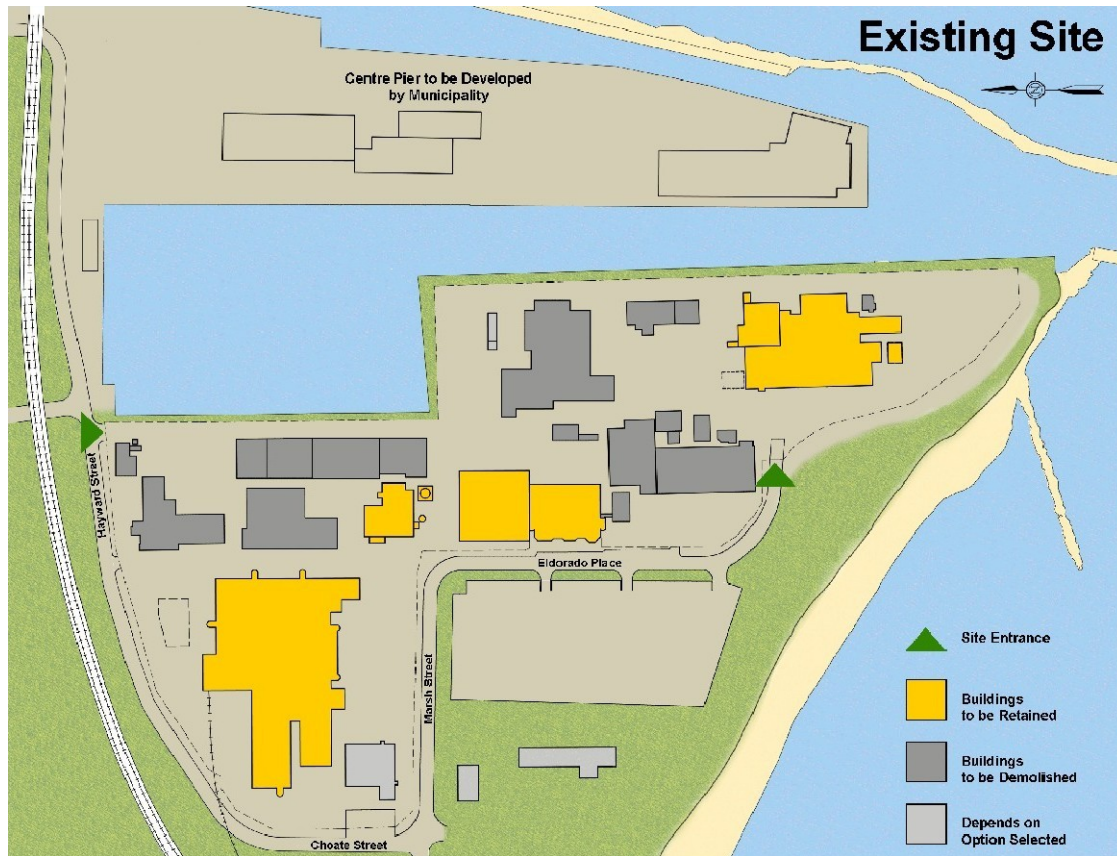


Figure 2.1 – Cameco Port Hope Site

Associated activities considered within the scope of the project include remediation and restoration of the site, management of contaminated process equipment and contaminated soils, hazardous and conventional waste, transportation of waste to the Long-term Waste Management Facility or to a conventional landfill site, and transportation of equipment and materials to and from the project site.

The interaction matrix included in this guidelines document provides greater details concerning project activities that will be considered in this environmental assessment. The matrix, once finalized, will be used to perform an initial assessment of the potential interactions of project activities and environmental components and their subcomponents.

A preliminary decommissioning plan for the proposed new buildings will be also identified and included in the cumulative effects assessment for the proposal.

TABLE 1 – PRELIMINARY LIST OF BUILDINGS TO BE DECOMMISSIONED AND/OR DEMOLISHED

Building Number	Building Name	Approx Footprint (m ²)	Construction Date	Past and Current Uses
2	Waste Recovery	1,903	1937-1944	Past: refining and conversion of uranium Current: technology development labs, maintenance shops, wastewater treatment circuit, back-up UO ₂ production equipment and the Clean Up Program (CUP) washing facility
5B	Scrap Processing	1,126	1926; 1947; 1957	Past: production of uranium metal Current: houses equipment for processing scrap metal
5C	Metals Plant	1,608	1961	Past: produce depleted uranium metal components Current: used for sorting and temporary storage of waste materials and for marshalling of drums
6	Warehouse	484	1957	Partial (very little): some general storage
7	Warehouse	400	1954	Drum Storage
12	Warehouse	1,130	1957; 1965	Drum Storage
12A	Warehouse	686	1975	Drum Storage
13	Cameco Technology Development Laboratory	373	1946; 1958	In Service
14	Metallurgical Products	234	1950	Past: used to process enriched uranium Current: used for storage of historic scrap enriched uranium in drums/pails
15	North Cooling Water pump house	24	1954	Not in use
22	Analytical Lab	663	1959	In Service
22A	Analytical Lab	466	1968	In Service
23	Radiography	81	1965	In Service
25	Cooling water pump house	88	1968; 1981	In use
26	Depleted Metal Storage & Stores	701	1968; 1978	Storage
27	East UF ₆ , CUP and Paint Booth	2,934	1969	Past : production of UF ₆ Current: used to prepare UF ₆ cylinders and temporary storage of UO ₂ product, UF ₄ powder, used anodes and waste materials.
31	Incinerator	104	1979	Out of Service
32	Truck Wash	204	1976 and 1979	Operational

Building Number	Building Name	Approx Footprint (m ²)	Construction Date	Past and Current Uses
			(storage addition)	
44	Mobile Equipment Repair	193	1976	Operational
45, 45A	Receiving, Stores and Non-destructive Examination	813	1981	Operational
63	Waste management	149	1973	Operational

TABLE 2 – PRELIMINARY LIST OF PROPOSED CONSTRUCTION ACTIVITIES

Building Number	Building Description	Approximate Footprint* (m ²)	Primary Functions
70	Receiving building	3250	Receiving, stores, non-destructive examination, guardhouse, emergency vehicle storage, Emergency Response Team (ERT) command centre and office areas
	Gas bottle storage enclosure at the receiving building	120	Receipt and storage of gas bottles
71	CUP building	1050	Scrap metal processing, electrical substation and office areas
72	Cameco Technical Department/Technical Services building	2650	Research and analytical laboratories, pilot laboratory, storage and office areas
73	Cylinder storage building	7950	Shipping, receiving and storage of approximately 1400 - 1700 UF ₆ cylinders
74	Visitor centre	700	Guardhouse, interpretive centre and auditorium
75	Drum storage building	4200	Receipt, shipment and storage of approximately 8000 drums. Drums could contain UO ₂ , ammonium diuranate (ADU), UF ₄ , KF, depleted U and uranium scrap. Other building functions include chemical storage, vehicle storage, vehicle maintenance and offices
76	Backup UO ₂ building	1750	Building shell for future backup UO ₂ production facility
3A	Control room addition	60	New powerplant control room
3B	Emergency generator addition	20	Addition to accommodate larger emergency generator
24E	Tote bin unloading addition	150	Indoor rotation and unloading of UO ₃ totes
29A	Addition to Building 29	700	Change room expansion and office areas
50B	Wastewater treatment, potassium hydroxide unloading and truck wash addition	390	Wastewater treatment, indoor potassium hydroxide unloading and vehicle wash bay
50C	Wet CUP addition	200	High pressure water blasting and temporary drum storage
50D	Maintenance addition	340	Radiography, maintenance office areas and storage
50E	Maintenance addition	170	Unassigned offices or storage
50F	Cylinder laydown addition	400	Expansion of existing cylinder laydown area
	New hydrogen and nitrogen tank compound	1900	
	Associated infrastructure and underground services	N/A	Infrastructure associated with new buildings, e.g. pipe racks, walkways, etc
*Areas 1000 m ² or greater rounded up to nearest 50 m ² . Areas less than 1000 m ² rounded up to the nearest 10 m ² .			

2.2 Scope of the Assessment

The scope of an assessment includes consideration of the factors to be considered in the environmental assessment and the scope of those factors. Detailed information on these aspects of the environmental assessment is provided below.

2.2.1 Factors to be Considered in the Comprehensive Study

The scope of the Comprehensive Study under the CEAA must include all the factors identified in paragraphs 16(1)(a) to (d) and 16(2)(a) to (d) of the CEAA and, as provided for under paragraph 16(1)(e), any other matter that the CNSC or the Minister requires to be considered.

Paragraphs 16(1)(a) to (d) and 16(2)(a) to (d) require that the factors be assessed include:

- the 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 projects or activities that have been or will be carried out;
- the significance of the effects identified above;
- comments from the public that are received in accordance with the CEAA and its regulations;
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects 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;
- the need for, and the requirements of, a follow-up program in respect of the project; and
- the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.

For the purpose of an EA, the CEA Act defines the “environment” as meaning the components of the Earth, and includes:

- land, water and air, including all layers of the atmosphere;
- all organic and inorganic matter and living organisms; and
- the interacting natural systems that include components referred to in (1) and (2) above.

An “environmental effect” from a project is defined by the CEAA as:

- any change that the project may cause in the “environment”, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act*;
- any effect of any “environmental effect” on:
 - health and socio-economic conditions
 - physical and cultural heritage
 - the current use of lands and resources for traditional purposes by aboriginal persons, or
 - any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;
- any change to the project that may be caused by the environment.

With the discretion allowed for in paragraph 16(1)(e) of the CEAA, the CNSC also requires consideration of:

- the need for the project and the benefits of the project; and
- consideration of traditional and local knowledge, where relevant.

Additional or more specific factors or issues to address in the EA may be identified during the conduct of the EA following consultation with the Minister, FAs and other stakeholders.

2.2.2 *Scope of the Factors to be Assessed*

Subsection 16(3) of the CEA Act requires that the RA establish the scope of the factors to be assessed. This involves establishing temporal and spatial boundaries of the factors to be assessed and is typically carried out by defining the *study areas* and *time frames for the factors to be assessed* of the Comprehensive Study assessment.

3 Structure of the Comprehensive Study Report

Should the Minister direct the CNSC to continue the Comprehensive Study process, the CNSC would prepare a Comprehensive Study Report under the following section headings. The CNSC recommends that the proponent’s technical study report use a similar structure.

Comprehensive Study Report

- Executive Summary
- 1) Introduction
- 2) Purpose of the Project
- 3) Need for the Project
- 4) Project Description
- 5) Alternative Means of Carrying Out the Project

- 6) Scope of the Environmental Assessment
- 7) Public Consultation Program
- 8) Description of the Existing Environment
- 9) Predicted Environmental Effects of the Project
 - Description of Assessment Methodology
 - Spatial and Temporal Boundaries of Assessment
 - Effects of the Project on the Environment
 - Effects of the Environment on the Project
 - Effects of the Project on the Capacity of Renewable and Non-Renewable Resources
 - Assessment of Potential Malfunctions and Accidents
 - Cumulative Environmental Effects
- 10) Determination of Significance
- 11) Follow-up Program
- 12) Conclusions and Recommendations
- 13) References

The recommended structure serves as a framework for explaining how the factors to be assessed, required under subsections 16(1) and 16(2) of the CEAA, are to be considered in the Comprehensive Study Report. Information about the project and the existing environment is necessary to permit a systematic consideration. The results of the technical study report will be documented in the Comprehensive Study Report to be prepared.

The parts of the assessment that are to be delegated to Cameco, in accordance with subsection 17(1) of the CEAA, are to be documented in the form of a technical EA Study Report in a manner consistent with this structure. The EA Study Report will be made available to the public as a support document to the Comprehensive Study Report.

3.1 Executive summary

This section should briefly describe the project, indicating the main predicted environmental effects. The key aspects of the project and the environment affected by the project should be highlighted, and the proposed mitigation measures that will render effects insignificant should be tied to the predicted effects. Any public concerns and uncertainties should also be noted.

3.2 Introduction

The introduction should include an overview of the project, including location, project components, associated activities, scheduling details and other key features. This section should also identify the project proponent. The intent of this overview is to provide context rather than description.

The introduction should also identify the CNSC's application of the CEAA, describing why the assessment is being carried out, including the triggers that have led to the assessment. This information will provide reviewers with an understanding of the context of the EA and the issues that have been addressed in it.

3.3 Purpose of the Project

The proposed project will be designed to achieve certain specific objectives. These objectives should be adequately described as the “purpose of the project”. The rationale for decommissioning these buildings should be provided. Alternative means considered to carry out the Vision 2010 project should be assessed as described in Section 3.6.

3.4 Need for the Project

The “need for the project” should be established from Cameco’s perspective and describe the problem or opportunity the project is intending to solve or satisfy.

3.5 Project Description

The main objective of the project description is to identify and characterize those specific components and activities that have the potential to interact with, and thus result in a likely change or disruption to, the surrounding environment under both normal operations and potential malfunction and accident situations.

The description of the project will refer to, and elaborate on, the items identified in the project scope, supported with appropriate maps and diagrams. It will include a proposed schedule for the different phases of the project as well as a detailed description of Cameco, including its ownership, organization, structure and technical capabilities.

Detailed regulatory guidance on how to plan decommissioning activities is provided in the CNSC regulatory guide G-219 (Reference 2). The project description should include the following information, provided in summary form with references made to more detailed information where applicable:

- the geographic location of the project, including site plans of the facility and the facility in relation to the surrounding community;
- a brief description, with diagrams, of the various areas, equipment, components and structures to be decommissioned; a similar description of the various areas, components and structures to be constructed.
- a history of the operation and any past abnormal operations, incidents or accidents that may affect the decommissioning activities;
- a description of specific malfunction and accident events that have a reasonable probability of occurring during the life of the project, including an explanation of how these events were identified for the purpose of this environmental assessment;
- a description of specific criticality events and a demonstration that consequences of the events do not violate criteria established by international standards (Reference 3) and national guidance (Reference 4) as a trigger for a temporary public evacuation;
- a statement of the final radiological, physical and chemical end-state objectives for the areas in the site subject to decommissioning;
- a description of any requirements for long-term institutional controls;

- results of surveys of the radiological and other potentially hazardous conditions of the buildings to be decommissioned, including a description of any remaining significant gaps or uncertainties in the measurements or expected condition of these facilities;
- an overview of the nature and source of any potentially significant risks from the project (including radiological risks) to the workers, the public and environment;
- planning envelopes indicating the approximate duration and sequence of work to be completed and expected completion, each with their own characteristics, decommissioning objectives and implementation schedules, and final end-state;
- a statement of, and rationale for, the preferred strategic approach to decommissioning within each planning envelope;
- a description of the waste management plan including descriptions of procedures to be used to segregate waste into different categories (i.e. radiological, non-radiological, hazardous, conventional), estimated quantities for each category and plans for reuse, recycle, store or disposal of waste; the processes for the collection, handling, transport, storage and disposal of radioactive, hazardous and non-hazardous waste to be generated by the project. (see section 6.3 of G-219);
- a description of a comprehensive environmental protection plan, including a health and safety plan, an erosion control plan, a contingency plan to address accidental releases of untreated contaminated water and releases of petroleum products, on site security requirements and a plan for minimizing disruption to business and residences;
- a description of a site security program; for example any physical separation between the operations area and decommissioned areas of the facility;
- descriptions of occupational health and safety programs and environmental protection programs for the decommissioning activities and works being proposed;
- characteristics of nuclear substances and other hazardous materials to be stored at the facility and the location of these substances in the facility;
- the sources and characteristics of any fire hazards;
- the sources and characteristics of any noise, odour, dust and other likely nuisance effects from the project;
- the predicted doses to workers involved with the associated operations and activities that are within the scope of this project;
- the key operational procedures relevant to protection of workers, the public and the environment relating to the project;
- the identification and description of engineered and administrative controls, including the use of an approved margin of subcriticality for safety;
- the key components of the facility and its physical security systems (excluding prescribed information) that are relevant to management of malfunctions and accidents that may occur during the siting and construction activities, and during the subsequent operations of the

proposed new facilities; and

- the predicted sources, quantities and points of release from the project of emissions and effluents containing nuclear substances and hazardous materials.

3.6 Alternative Means of Carrying Out the Project

The Comprehensive Study Report must include various technically and economically feasible ways for the project to be implemented and carried out. Under the CEAA, the consideration of these alternatives requires an environmental effects assessment of alternative means. The selection criteria used to identify a preferred alternative must include environmental factors and may include economic, technical and social factors. The information being used to make that decision and the decision-making process must be documented in the Comprehensive Study Report.

The alternatives must be identified, information must be collected on each alternative and a selection criterion must be applied to determine a preferred alternative.

3.7 Public Consultation Program

The assessment will include notification of, and consultation with, potentially affected stakeholders, including the local public and First Nations, as well as the municipal governments in the project area. Various media will be used to inform and engage individuals, interest groups, local governments and other stakeholders in the assessment.

Cameco will be expected to hold appropriate public consultation/information meetings, and Cameco's stakeholder consultation program will be monitored by CNSC staff throughout the EA process.

The purpose of Cameco's program would be to inform the public on the project and to consult the public on the results of technical studies. The CNSC will retain the responsibility to consult the public on the interpretation of technical studies, on recommendations and conclusions, and on the draft version of the Comprehensive Study Report. The CEA Agency will be responsible to make the final Comprehensive Study Report available for public comment.

Various stakeholders, including the following, will be consulted throughout the EA process:

- federal government;
- provincial government;
- local government;
- First Nations and Aboriginal communities;
- established committees;
- neighbouring residents;
- general public;
- local businesses; and
- non-governmental organizations and interest groups.

The Comprehensive Study Report will contain a summary review of the comments received during the EA process. The report will indicate how issues identified have been considered in the completion of the assessment, or where relevant, how they may be addressed in any subsequent CNSC licensing and compliance process.

The program will also include opportunities for the public to review and comment on the Comprehensive Study Report prior to its submission to the Minister.

3.8 Description of the Existing Environment

A description of the existing environment is needed to determine the likely interactions between the project and the surrounding environment and, conversely, between the environment and the project, during the life cycle of the project. The description includes both the biophysical environment (such as ecological, radiological, geological, hydrological, hydrogeological and climatic conditions) and the socio-economic environment (human, cultural). The description of the existing environment should include sufficient information on the baseline conditions to allow the environmental impacts of the licensed activities to be assessed.

A screening of likely project-environment interactions will be used in identifying the relevant components of the environment that need to be described. In general, the environmental components that are typically described in the various study areas include, but are not necessarily limited to:

- human health;
- surface water;
- atmosphere;
- aquatic environment;
- geology and hydrogeology;
- terrestrial environment;
- land resources;
- cultural heritage and aboriginal environment; and
- socio-economic conditions.

These environmental components are further divided into environmental subcomponents.

Valued Ecosystem Components (VECs) are environmental attributes or components identified as having a legal, scientific, cultural, economic or aesthetic value. Where relevant, VECs in the existing environment will be identified and used as specific assessment endpoints. VECs should be identified following consultations with the public, First Nations, federal and provincial government departments and other relevant stakeholders. A preliminary table of proposed VECs for this project is included as Appendix A to this document. The final list of VECs to be considered in this assessment must be reviewed and accepted by CNSC staff in the early phases of the EA study.

The required level of detail in the description of the existing environment will be less where the potential interactions between the project and various components of the environment are weak or remote in time and/or space.

Relevant existing information, including traditional and local knowledge, may be used to describe the environment. Where that information is significantly lacking, additional research and field studies may be required. CNSC staff will review any work done by Cameco to fill identified gaps in information as progress is being made.

3.9 Prediction of Environmental Effects of the Project

3.9.1 Description of the Assessment Methodology

The consideration of environmental effects in the Comprehensive Study should be done in a systematic and traceable manner, and the assessment methodology should be summarized. The results of the assessment process should be clearly documented using summary matrices and tabular summaries where appropriate.

3.9.2 Spatial and Temporal Boundaries of Assessment

The consideration of the environmental effects in the Comprehensive Study needs to be conceptually bounded in both time and space. This is more commonly known as defining the *study areas* and *time frames*, or spatial and temporal boundaries, of the Comprehensive Study assessment.

Both the study areas and time frames will remain flexible during the assessment to allow the full extent of a likely environmental effect to be considered in the Comprehensive Study. For instance, should the results of air modelling demonstrate that there is dispersion of a contaminant that is likely to cause an environmental effect beyond the boundaries identified, it will be taken into account in the assessment. Where the effects of the project are expected to continue beyond the operation of the facility, for example as a result of contamination related to the project, a time frame appropriate for describing and taking into account the potential longer-term residual effects will be used.

3.9.2.1 Study Areas

The geographic study areas for this Comprehensive Study must encompass the areas of the environment that can reasonably be expected to be affected by the project, or which may be relevant to the assessment of cumulative environmental effects. Study areas will encompass all relevant components of the environment, including the people; non-human biota; land; water; air and other aspects of the natural and human environment. Study boundaries will be defined taking into account ecological, technical and social/political considerations.

The following geographic study areas are proposed:

- **Site Study Area** includes Cameco's PHCF site and the area encompassed by the routes to transport contaminated soils and materials to storage and disposal sites;
- **Local Study Area** is defined as that area existing outside the site study area boundary where there is a reasonable potential for immediate impacts due to either ongoing normal activities, or to possible abnormal operating conditions. It includes the buildings and infrastructure at Cameco's PHCF licensed site. The outer boundaries of the Local Study

Area encompass an area that includes lands within the Municipality of Port Hope, and the portion of Lake Ontario abutting and used by the community for such activities as recreation, water supply and waste water discharge. The boundaries may change as appropriate following a preliminary assessment of the spatial extent of potential impact. The Local Study Area has been defined as Ward 1 in the Municipality of Port Hope (i.e. the former Town of Port Hope).

- **Regional Study Area** is defined as the area within which there is the potential for cumulative and socio-economic effects. It includes the lands, communities and portions of Lake Ontario around the Port Hope conversion facility that may be relevant to the assessment of any widespread effects of the project. The Regional Study Area could be described as Wards 1 and 2 in the Municipality of Port Hope, but would be extended when necessary; for example, in the assessment of air quality monitoring.

3.9.2.2 Time Frames

The temporal boundaries for this assessment establish the time period over which project specific and cumulative effects will be considered.

The initial time frame will be the duration of the decommissioning and demolition of the existing buildings, including site remediation and restoration activities, and the construction and operation of the proposed new buildings (proposed to take approximately 6 years) and of their eventual decommissioning, based on the Preliminary Decommissioning Plan (PDP).

3.9.3 *Assessment of Effects Caused by the Project on the Environment*

The assessment will be conducted in a manner consistent with the following general method:

- 1) ***Identify the potential interactions between the project activities and the components and sub-components of the environment during decommissioning, demolition of existing buildings and associated remediation and restoration activities to be conducted in these areas of the facility, and construction and operation of the new buildings under normal conditions and under the relevant accident and malfunction conditions.***

Specific attention will be given to interactions between the project and the identified VECs. In this step, the standard design and operational aspects from the project description that prevent or significantly reduce the likelihood of interactions occurring with the environment should be reviewed. Opportunities for additional impact mitigation measures are addressed in step 3 below. Appendix B provides a proposed preliminary matrix of likely project-environment interactions for this project. The final interaction matrix will identify all interactions that need to be assessed in the Comprehensive Study.

- 2) ***Describe the resulting changes that likely would occur to the components and sub-components of the environment and VECs as a result of the identified interactions with the project.***

Each environmental change must be described in terms of whether it is direct or indirect, and

positive or adverse.

Identified changes in socio-economic conditions and various aspects of culture, health, heritage, archaeology and traditional land and resource use may be limited to those that are likely to result from the predicted changes that the project is likely to cause to the environment. The consideration of public views, including any perceived changes attributed to the project, should be recognized and addressed in the assessment methodology. This would include the identification of First Nations as an important group.

Quantitative as well as qualitative methods may be used to identify and describe the likely adverse environmental effects. Professional expertise and judgment may be used in interpreting the results of the analyses. The basis of predictions and interpretation of results, as well as the importance of remaining uncertainties, will be clearly documented in the EA Study Report.

3) *Identify and describe mitigation measures that may be applied to each likely adverse effect (or sequence of effects), and that are technically and economically feasible.*

Mitigation strategies should reflect avoidance, precautionary and preventive principles; that is, emphasis should be placed on tempering or preventing the cause or source of an effect, or sequence of effects, before addressing how to reverse or compensate for an effect once it occurs.

Where the prevention of effects cannot be assured, or the effectiveness of preventive mitigation measures is uncertain, further mitigation measures in the form of contingency responses including emergency response plans will be described. Where cost/benefit analyses are used to determine economic feasibility of mitigation measures, the details of those analyses will be included or referenced.

4) *Describe the significance of the environmental effects that likely will occur as a result of the project, having taken into account the implementation of the proposed mitigation measures.*

The criteria for judging and describing the significance of the residual (post-mitigation) effects will include: magnitude, duration, frequency, timing, and probability of occurrence, ecological and social context, geographic extent, and degree of reversibility.

Specific assessment criteria proposed in the EA methodology for this project will be submitted to CNSC staff in the early phases of the EA study for review and acceptance. Existing regulatory and industry standards and guidelines are relevant as points of reference for judging significance. However, professional expertise and judgement should also be applied in judging the significance of any effect. All applicable federal and provincial laws must be respected.

The analysis must be documented in a manner that readily enables conclusions on the significance of the environmental effects to be drawn. The CNSC, as the responsible authority for the EA project, must document in the Comprehensive Study Report a conclusion, taking into account the mitigation measures, as to whether the project is likely to cause significant adverse environmental effects.

3.9.4 *Assessment of Effects of the Environment on the Project*

The assessment must take into account how the environment could adversely affect the project; for example, from severe weather conditions such as heavy rainfall, flooding, high winds or fluctuations in lake levels. The assessment must 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 life span.

This part of the assessment will be conducted in a stepwise fashion, similar to that described for the foregoing assessment of the project effects. The possible important interactions between the natural hazards and the project will be first identified, followed by an assessment of the effects of those interactions, the available additional mitigation measures, and the significance of any residual likely adverse environmental effects.

3.9.5 *Assessment of the Effects on the Capacity of Renewable and Non-Renewable Resources*

The potential interactions between the project and the environment will be identified and assessed in order to determine the likelihood of interactions between the project and resource sustainability.

3.9.6 *Assessment of Potential Malfunctions and Accidents*

Information on potential malfunctions and accidents is also necessary to permit consideration of relevant environmental effects in the assessment. Early in the conduct of the EA studies, the potential malfunctions and accidents to be considered in the EA will be reviewed and must be accepted by CNSC staff. Information on potential malfunctions and accidents should include:

- a description of specific malfunction and accident events that have a reasonable probability of occurring during the decommissioning phase of the project, including an explanation of how these events were identified for the purpose of this environmental assessment;
- a description of the source, quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical, chemical and radiological) likely to be released to the surrounding environment during the postulated malfunctions and accidents; and
- a description of any contingency, cleanup or restoration work in the surrounding environment that would be required during, or immediately following, the postulated malfunction and accident scenarios.

Expected scenarios include, but are not limited to, accidental spills, accidents from heavy equipment/vehicular movements, vehicular accidents during transport of contaminated material, container collapse/failure, failure of the harbour wall, structural failures of equipment being decommissioned or of buildings being demolished, unrestricted release of radioactive materials, extreme weather conditions during remediation efforts (e.g. flooding, heavy rainfall events, high winds).

3.9.7 *Assessment of Cumulative Effects*

The effects of the project must be considered together with those of other projects and activities

that have been, or will be carried out, and for which the effects are expected to *overlap* with those of the project (i.e., overlap in same geographic area and time). These are referred to as *cumulative environmental effects*. For example, the Port Hope Area Initiative, which is a proposed project to clean up and safely manage historic low-level radioactive waste in the Port Hope area, would be a potential project to be included in an assessment of cumulative effects.

An identification of the specific projects and activities considered in the cumulative effects will be included in the Comprehensive Study Report. In general, the cumulative effects assessment will consider the combined effects of the Vision 2010 Project with the neighbouring or regional industries and other developments.

The information available to assess the environmental effects from other projects can be expected to be more conceptual and less detailed as those effects become more remote in distance and time to the project, or where information about another project or activity is not available. The consideration of cumulative environmental effects may therefore be at a more general level of detail than that considered in the assessment of the direct project-environment interactions.

Where potentially significant adverse cumulative effects are identified, additional mitigation measures may be necessary.

3.10 Determination of Significance

The preceding steps in the Comprehensive Study will consider the significance of the effects of:

- the project on the environment;
- the environment on the project;
- project malfunctions and accidents on the environment; and
- this project in combination with activities of other past, present or known future projects (cumulative effects).

The Comprehensive Study will consider all of these effects in coming to a final conclusion as to whether the project, taking into account the mitigation measures, is likely cause significant adverse environmental effects. The CNSC, as the responsible authority, will document this conclusion in the Comprehensive Study Report.

3.11 Follow-up Program

The purpose of the follow-up program is to assist in determining if the environmental and cumulative effects of the project are as predicted in the Comprehensive Study Report. It is also to confirm whether the impact mitigation measures are effective, and to determine if any new mitigation strategies may be required. The design of the program will be appropriate to the scale of the project and the issues addressed in the EA.

If a licence is issued to Cameco pursuant to the NSCA, the CNSC licensing and compliance program will be used as the mechanism for ensuring the final design and implementation of any follow-up program and the reporting of program results. The follow-up program would be based on the regulatory principles of compliance, adaptive management, reporting and analysis.

The follow-up program will include a description of ‘what is being monitored’ and its rationale. The program will also include thresholds/triggers for implementing contingency plans/adaptive management.

4 PUBLIC PARTICIPATION IN THE FEDERAL ENVIRONMENTAL ASSESSMENT

4.1 Invitation for Public to Comment on this Scoping Document

The public is invited to comment on the following:

- the proposed scope of the project for the purposes of the EA (Section 2.1 of this document);
- the factors proposed to be considered (Section 2.2.1 of this document);
- the proposed scope of those factors (Section 2.2.2 of this document);
- public concerns in relation to the proposed project, including:
 - the potential for the project to cause adverse environmental effects; and
 - the ability of a Comprehensive Study to address issues relating to the project.

Persons wishing to submit comments on the proposed project may do so in writing. Comments should be sent to the CNSC at the address of facsimile numbers provided in this document. Please reference the file name “Cameco Corporation – Proposed Port Hope Conversion Facility Vision 2010 Project”, and the Canadian Environmental Assessment Registry number 06-03-22672 in comment submissions. The CNSC will receive and share all public comments on this document, and will distribute them to all other federal authorities.

Comments must be received no later than April 11, 2008.

Pursuant to Subsection 55(1) of the CEAA, the electronic component of the Canadian Environmental Assessment Registry (CEAR) can be accessed at the web address www.ceaa-acee.gc.ca. The CEAR also includes a paper-based project file with related records. The CEAR number for this project is 06-03-22672.

A discussion of comments received from the public on this draft EA Guidelines document, and how those comments were considered, will be submitted to the Minister along with the final EA Guidelines.

4.2 Public Consultation on the Comprehensive Study Report

The public will be given an opportunity to participate in the conduct of the EA through public meetings to be held by the proponent, the CNSC and the CEA Agency. The requirements for this participation are set out in Section 3.7 of this document. If the EA continues as a Comprehensive Study, the public will also be provided with an opportunity to examine the EA Study Report and comment on the draft Comprehensive Study Report.

Whether the EA proceeds by means of a comprehensive study or is referred to a mediator or review panel, participant funding will be made available by the CEA Agency to facilitate public participation.

The CEA Agency will facilitate public review and comment on the final Comprehensive Study Report.

4.3 Public Registry

A public registry for the assessment has been established as required by Section 55 of the CEAA. This includes identification of the assessment in the CEAR, which can be accessed on the Internet site of the CEA Agency at www.ceaa.gc.ca. The CEAR number for this project is 06-03-22672.

The CEAR Internet site will include the following documentation:

- description of the project;
- notices of commencement and, if applicable, termination;
- notice of the availability of the EA Guidelines document and the EA Track Report;
- notices of Ministerial EA Track Decision and EA Decision Statement;
- notices requesting public input;
- the final Comprehensive Study Report; and
- notice of the RA's course of action decision.

Interested parties will be able to obtain copies of these documents when they are available by accessing the CEAR website and downloading the files. Interested parties may also obtain copies of related documentation included in the CEAR paper-based project file from the CNSC contact for the project (see section 4.4).

4.4 Contact for Assessment

Persons wishing to obtain additional information or provide comments on the EA being conducted on Cameco's Port Hope conversion facility Vision 2010 Project in Port Hope, Ontario may do so through the following contact:

Liana Ethier, Environmental Assessment Officer
Canadian Nuclear Safety Commission
280 Slater Street
P.O. Box 1046
Station B
Ottawa, ON
K1P 5S9

Phone: 1-800-668-5284
Fax: 613-995-5086
Email: CEAAinfo@cnsccsn.gc.ca

5 REFERENCE(S)

1. Letter, R. Steane (Cameco) to B. Howden (CNSC), “*Port Hope Conversion Facility Vision 2010 Project Description*”, June 22, 2006. Document # 1326142.
2. CNSC Regulatory Guide G-219 “*Decommissioning Planning for Licensed Activities*”, June 2000.
3. Food and Agriculture Organization of the United Nations, International Atomic Energy Agency, International Labour Organisation, OECD Nuclear Energy Agency, Pan American Health Organization, United Nations Office for the Co-Ordination of Humanitarian Affairs, World Health Organization, “*Preparedness and Response for a Nuclear or Radiological Emergency, Safety Requirements*”, Safety Standards Series No. GS-R-2, IAEA, Vienna, Austria, 2002
4. Health Canada, “*Canadian Guidelines for Intervention during a Nuclear Emergency*”, Document H46-2/03-326E, Ottawa, Ontario, November 2003

APPENDIX A
Preliminary List of Proposed Valued Ecosystem Components (VECs)

Environmental Components	Sub-components	Relevant VECs	Rationale
Human Health	Radiation Dose to Public	Radiation dose to: <ul style="list-style-type: none"> • Nearest residents • Recreational land users • Public along transportation corridors 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Radiation Dose to Workers	Radiation dose to: <ul style="list-style-type: none"> • Workers working directly on the Vision 2010 project activities • Other workers at the Port Hope conversion facility 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Public Exposure to Non-radiological Constituents	Air quality at locations of nearest residents and recreation land uses	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Worker Exposure to Non-radiological Constituents	Worker air quality	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Conventional Health and Safety	Workers	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
Surface Water	Hydrology	Water flow experienced by: <ul style="list-style-type: none"> • Nearest residents • Recreational land user 	Humans are potentially exposed to stressors produced by the Project Works and Activities during the construction phase Protection of human health
	Surface Water Quality and Quantity (including potable water) – Radiological	Water flow and quality experienced by: <ul style="list-style-type: none"> • Nearest residents • Recreational land user 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Surface Water Quality and Quantity (including potable water)– Non-Radiological	Water flow and quality experienced by: <ul style="list-style-type: none"> • Nearest residents • Recreational land user 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Sediment Quality and Quantity - Radiological	Aquatic invertebrate community (crayfish)	Pathway to VECs

Environmental Components	Sub-components	Relevant VECs	Rationale
	Sediment Quality and Quantity – Non-Radiological	Aquatic invertebrate community (crayfish)	Pathway to VECs
Atmospheric Environment	Air Quality - Radiological	Air quality at: <ul style="list-style-type: none"> • Nearest residents • Recreational land user 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Air Quality Non-Radiological	Air quality at: <ul style="list-style-type: none"> • Nearest residents • Recreational land user 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Noise	Noise level at: <ul style="list-style-type: none"> • Nearest residents • Recreational land user 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
	Dust	Dust levels at: <ul style="list-style-type: none"> • Nearest residents • Recreational land user 	Humans are potentially exposed to stressors produced by the Project Works and Activities Protection of human health
Aquatic Environment	Aquatic Biota and Habitat	<ul style="list-style-type: none"> • Sport fishery • Port Hope harbour fish community • Forage fish community • Aquatic vegetation • Riparian wildlife – muskrat, scaup, • Cormorant • Amphibians 	Aquatic species are potentially exposed to stressors produced by the Project Works and Activities Protection of ecological health during various project phases.
Geology and Hydrogeology	Soil Quality - Radiological		Pathway to VECs
	Soil Quality – Non-Radiological		Pathway to VECs
	Soil Stratigraphy		
	Bedrock geology and stratigraphy		
	Groundwater Flow		Pathway to VECs
	Groundwater Quality (including potable water) – Radiological		Pathway to VECs
	Groundwater Quality (including potable water) – Non-Radiological		Pathway to VECs

Environmental Components	Sub-components	Relevant VECs	Rationale
Terrestrial Environment	Vegetation Communities and Species	Terrestrial vegetation (grass)	Protection of ecological health
	Wildlife Habitat	None	N/A
	Wildlife Communities and Species	<ul style="list-style-type: none"> • Soil invertebrates • Red fox (omnivore) • Deer mouse (omnivore mostly insects) • Rabbit (herbivore) • Robin (insectivore) 	<p>Terrestrial species are potentially exposed to stressors produced by the Project Works and Activities</p> <p>Protection of ecological health</p>
Visual Setting and Transportation	Landscape and Visual Setting	Visual appearance of Cameco PHCF	Residents and visitors enjoy the views of Lake Ontario from many vantage points. The Project may affect the quality (positively or negatively) of the landscape and visual setting of the waterfront
	Transportation Network	Traffic	Project works and activities may change traffic volumes and patterns
Cultural and Aboriginal Environment	Archaeological Resources	Archaeological resources	Potential to affect archaeological resources is limited to the construction phase of the project
	Heritage Resources	Heritage resources	Potential to affect physical and cultural resources is limited to the construction phase of the project
	Cultural Resources	Cultural resources	Potential to affect cultural and/or prehistoric heritage resources is limited to the construction phase of the project
		Prehistoric heritage resources	
	Aboriginal Interests - Communities	Employment and business interests	Potential for construction jobs and business opportunities for Aboriginal workers/businesses.
Aboriginal Interests - Traditional Land and Resource Use	Aboriginal and treaty rights	Construction phase may interact with Aboriginal and Treaty Rights related to the lakeshore	
Socio-economic Conditions	Population and Economic Base	Business operations Economic base Cameco employment	Project works and activities may affect aspects of the local economic community positively or negatively.
		Tourism	Tourist activities, businesses and events may be susceptible to the nuisance effects of Project works and activities, project related traffic, and changes in public attitudes related to the Project.
		Property Values	Changes in property values may affect (adversely or positively) existing and prospective property owners as result of Project works and activities.

Environmental Components	Sub-components	Relevant VECs	Rationale
	Community Infrastructure	Use of municipal transportation network Contributions to the landfill	Increased use of municipal road to transport material/supplies to the project site and to remove materials from the project site for disposal. Potential to send clean material to local landfill facility.
	Community Services	Recreation and community features/resource use	Recreational features (e.g waterfront, trails) and activities conducted by residents and visitors may be affected by project-related nuisance effects, and changes in public attitudes related to the Project. The Project may also affect the attractiveness of existing features or directly/indirectly to the creation of new features or opportunities.
	Residents and Communities	Use and enjoyment of property Community/Neighbourhood Character	Residents rely on their property and amenities in their neighborhoods for a variety of indoor and outdoor social activities. People's use and enjoyment of their property may be susceptible to the temporary nuisance effects arising from the Project works and activities and changes in public attitudes related to the Project. The distinctive or unique qualities of the community give a community or neighbourhood its character

APPENDIX B

Likely Interactions between the Project and Environmental Components		PRELIMINARY PROPOSED INTERACTION MATRIX																																		
		ENVIRONMENTAL COMPONENTS																																		
		Human Health					Surface Water				Atmospheric Environment			Aquatic Environment			Geology / Hydrogeology					Terrestrial Environment			Visual Setting and Transportation			Cultural and Aboriginal Environment		Socio-Economic Conditions						
Radiation Doses to General Public	Radiation Doses to Workers	Non-radiological Exposure to Public	Non-radiological Worker Exposure	Conventional Health & Safety (Physical Hazards)	Radioactivity in surface water	Surface Water Quality (Chemical/Thermal)	Flow/Level	Sediments	Drainage Alteration	Radioactivity in Atmospheric Environment	Air Quality (Chemical)	Noise, Dust	Aquatic Biota	Aquatic habitat	Impingement/ Entrapment	Soil Quality – Radiological	Soil Quality – Non-radiological	Groundwater Flow	Groundwater Quality - Radiological	Groundwater Quality – Non-radiological	Vegetation Communities and Species	Wildlife Habitat	Wildlife Communities and Species	Land Use	Transportation Network	Landscape and Visual Setting	Aboriginal Interests	Archaeological, Cultural, Heritage Resources	Population and Economic Base	Community Infrastructure	Community Services	Residents and Communities	Renewable/ non-renewable resources			
Decommissioning Activities																																				
Conduct radiological surveys		•			•																															
Conduct non-radiological surveys				•	•																															
Remove remaining chemicals, equipment and materials not required for decommissioning		•		•	•							•																								
Purge and rinse process circuits, tanks and vessels and related systems, remove remaining chemical hazards (flammable materials) and drums (including contaminated drummed waste), and remaining physical hazards		•		•	•	•	•																													
Manage/remove all remaining process equipment and piping, including contaminated process piping and active vessels		•		•	•					•																										

Likely Interactions between the Project and Environmental Components		PRELIMINARY PROPOSED INTERACTION MATRIX																																			
		ENVIRONMENTAL COMPONENTS																																			
		Human Health					Surface Water				Atmospheric Environment			Aquatic Environment			Geology / Hydrogeology					Terrestrial Environment			Visual Setting and Transportation			Cultural and Aboriginal Environment		Socio-Economic Conditions							
Radiation Doses to General Public	Radiation Doses to Workers	Non-radiological Exposure to Public	Non-radiological Worker Exposure	Conventional Health & Safety (Physical Hazards)	Radioactivity in surface water	Surface Water Quality (Chemical/Thermal)	Flow/Level	Sediments	Drainage Alteration	Radioactivity in Atmospheric Environment	Air Quality (Chemical)	Noise, Dust	Aquatic Biota	Aquatic habitat	Impingement/ Entrainment	Soil Quality – Radiological	Soil Quality – Non-radiological	Groundwater Flow	Groundwater Quality - Radiological	Groundwater Quality – Non-radiological	Vegetation Communities and Species	Wildlife Habitat	Wildlife Communities and Species	Land Use	Transportation Network	Landscape and Visual Setting	Aboriginal Interests	Archaeological, Cultural, Heritage Resources	Population and Economic Base	Community Infrastructure	Community Services	Residents and Communities	Renewable/ non-renewable resources				
Remove radiological and chemical hazardous materials and biohazards (asbestos, PCB, mercury, ODS, halocarbon, lead-based paint containing materials and equipment), and mould and animal detritus	•	•		•	•																																
Cut (torch) process equipment, pipes, tanks/vessels – (airborne emissions)				•	•							•																									
Demolition Activities																																					
In preparation for demolition, remove loose and near surface contamination (radiological and metal) on all internal building surfaces (pressure washing, vacuuming, steam cleaning, scabbing, etc.)		•			•	•																															
Remove building services: water, gas, steam, hydro, electrical, ventilation; interior and near exterior perimeter of building, roof, exterior siding (metal, concrete block/brick or translucent panels), structural steel																																					
Demolish roof, walls, floor slabs and foundations					•							•																									

Likely Interactions between the Project and Environmental Components		PRELIMINARY PROPOSED INTERACTION MATRIX																															
		ENVIRONMENTAL COMPONENTS																															
		Human Health					Surface Water				Atmospheric Environment			Aquatic Environment			Geology / Hydrogeology				Terrestrial Environment			Visual Setting and Transportation			Cultural and Aboriginal Environment		Socio-Economic Conditions				
Radiation Doses to General Public	Radiation Doses to Workers	Non-radiological Exposure to Public	Non-radiological Worker Exposure	Conventional Health & Safety (Physical Hazards)	Radioactivity in surface water	Surface Water Quality (Chemical/Thermal)	Flow/Level	Sediments	Drainage Alteration	Radioactivity in Atmospheric Environment	Air Quality (Chemical)	Noise, Dust	Aquatic Biota	Aquatic habitat	Impingement/ Entrainment	Soil Quality – Radiological	Soil Quality – Non-radiological	Groundwater Flow	Groundwater Quality - Radiological	Groundwater Quality – Non-radiological	Vegetation Communities and Species	Wildlife Habitat	Wildlife Communities and Species	Land Use	Transportation Network	Landscape and Visual Setting	Aboriginal Interests	Archaeological, Cultural, Heritage Resources	Population and Economic Base	Community Infrastructure	Community Services	Residents and Communities	Renewable/ non-renewable resources

Management of Removed Decommissioning and Demolition Waste

Activity	Radiation Doses to General Public	Radiation Doses to Workers	Non-radiological Exposure to Public	Non-radiological Worker Exposure	Conventional Health & Safety (Physical Hazards)	Radioactivity in surface water	Surface Water Quality (Chemical/Thermal)	Flow/Level	Sediments	Drainage Alteration	Radioactivity in Atmospheric Environment	Air Quality (Chemical)	Noise, Dust	Aquatic Biota	Aquatic habitat	Impingement/ Entrainment	Soil Quality – Radiological	Soil Quality – Non-radiological	Groundwater Flow	Groundwater Quality - Radiological	Groundwater Quality – Non-radiological	Vegetation Communities and Species	Wildlife Habitat	Wildlife Communities and Species	Land Use	Transportation Network	Landscape and Visual Setting	Aboriginal Interests	Archaeological, Cultural, Heritage Resources	Population and Economic Base	Community Infrastructure	Community Services	Residents and Communities	Renewable/ non-renewable resources	
• Decontamination activities																																			
Clean (pressure wash, sandblast, etc.) process equipment, including piping and active tanks/vessels to remove radioactive materials		•			•																														
Clean (pressure wash, sandblast, etc.) process equipment, including piping and active tanks/vessels contaminated with chemicals or metals				•	•																														
Removal of tank/vessel heels		•		•	•																														
Ensure clearance levels with radiological and non-radiological surveys.		•		•	•																														
• Waste segregation activities																																			
Salvaging activities				•	•																														•
Segregation activities (by waste type)				•	•																														
• Transportation of waste																																			
Survey and wash/clean vehicles prior to leaving worksite						•																													

Likely Interactions between the Project and Environmental Components		PRELIMINARY PROPOSED INTERACTION MATRIX																																			
		ENVIRONMENTAL COMPONENTS																																			
		Human Health					Surface Water				Atmospheric Environment			Aquatic Environment			Geology / Hydrogeology				Terrestrial Environment			Visual Setting and Transportation			Cultural and Aboriginal Environment		Socio-Economic Conditions								
Radiation Doses to General Public	Radiation Doses to Workers	Non-radiological Exposure to Public	Non-radiological Worker Exposure	Conventional Health & Safety (Physical Hazards)	Radioactivity in surface water	Surface Water Quality (Chemical/Thermal)	Flow/Level	Sediments	Drainage Alteration	Radioactivity in Atmospheric Environment	Air Quality (Chemical)	Noise, Dust	Aquatic Biota	Aquatic habitat	Impingement/ Entrainment	Soil Quality – Radiological	Soil Quality – Non-radiological	Groundwater Flow	Groundwater Quality - Radiological	Groundwater Quality – Non-radiological	Vegetation Communities and Species	Wildlife Habitat	Wildlife Communities and Species	Land Use	Transportation Network	Landscape and Visual Setting	Aboriginal Interests	Archaeological, Cultural, Heritage Resources	Population and Economic Base	Community Infrastructure	Community Services	Residents and Communities	Renewable/ non-renewable resources				
Vehicular movements between PHCF and the Long Term Waste Management Facility	•	•										•													•	•				•							
Vehicular movements between PHCF and conventional landfill site (demolition debris)												•													•	•				•							
Vehicular movements between PHCF and recycle outlets												•													•	•				•							
• Storage / disposal																																					
Storage of sludge (tank heels), spent filters and other products from decontamination activities				•		•	•		•							•																					
Storage of contaminated wash waters/rinses produced from decontamination of process equipment, pipes and tanks/vessels, wash waters from cleansed internal building surfaces (radiological and metals)				•		•	•									•	•																				
Storage of contaminated solid waste produced from decontamination of process equipment, pipes and tanks/vessels (sandblasting, etc.)				•	•	•	•										•																				

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Disposal of conventional demolition waste				•								•												•	•										
Site Remediation																																			
Conduct radiological survey and sample soil		•		•	•					•						•																			
Locate underground services and features				•													•							•											
Excavate contaminated soils		•		•	•					•	•	•					•						•												
Dewater saturated excavated (contaminated) soils		•		•	•							•					•			•			•												
Storage of contaminated groundwater produced during excavations				•	•	•										•	•	•																	
Segregate contaminated soils by activity/contamination level		•		•	•											•																			
Transport contaminated soils	•	•	•	•	•																			•	•										
Store/Dispose contaminated soils		•		•	•	•				•	•					•	•	•	•	•															
Transport and backfill excavations with clean fill				•								•										•		•	•										
Site Rehabilitation																																			

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Retaining walls (shoring required during excavation)					•					•		•											•			•													
Landscaping																		•							•		•												
Vehicular movements to and from site												•													•														
New Buildings																																							
• Construction																																							
Conduct radiological survey		•																																					
Excavate potentially contaminated soils	•	•		•	•	•	•	•	•		•	•					•	•	•	•	•		•																
Construct new UO ₂ drum storage building					•		•	•				•	•				•	•	•	•					•			•	•		•					•			
Construct additions to UF ₆ plant for wastewater treatment, indoor potassium hydroxide unloading and scrap metal processing					•		•	•				•	•				•	•	•	•				•			•	•		•						•			
Construct new receiving building, possibly combined with non-destructive examination (NDE) and emergency vehicles storage					•		•	•				•	•				•	•	•	•				•			•	•		•						•			
Construct new laboratory building					•		•	•				•	•				•	•	•	•				•			•	•		•							•		

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Construct new UF ₆ cylinder storage building				•		•	•				•	•					•	•	•			•			•		•	•	•	•			•			
Wash/clean vehicles prior to leaving worksite						•																														
Vehicular movements between PHCF and the Long-Term Waste Management Facility	•	•										•													•	•				•						
Vehicular movements between PHCF and conventional landfill site (construction debris)												•													•	•				•						
• Operation																																				
Storage of UO ₂ drums (drum handling, etc.)		•			•	•				•						•			•											•					•	•
Wastewater treatment		•		•		•	•						•	•																•					•	•
Laboratory (analytical and research)		•		•																									•						•	•
Storage of UF ₆ cylinders (cylinder handling, etc.)		•			•	•				•						•			•										•					•	•	
Abnormal Events																																				
Accidental radioactive/chemical spills	•	•	•	•	•	•	•			•	•		•	•		•	•		•	•		•						•	•				•	•		

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Structural failure while conducting dismantling/demolition activities (physical hazard)		•		•	•						•	•																								
Fire	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Vehicular/heavy equipment accidents (on-site and off-site)	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Environment on the Project																																				
Extreme climate events (heavy rainfall, rise in nearby water levels)	•	•	•	•	•	•	•	•	•				•	•	•				•	•	•					•	•	•	•				•			