Canada's Nuclear Regulator

Reactor Facilities

Licence Application Guide: Licence to Decommission a Reactor Facility

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Preface

This regulatory document is part of the CNSC's reactor facilities series of regulatory documents, which includes licence application guides for other lifecycle stages of reactor facilities. The full list of regulatory document series is included at the end of this document and can also be found on the CNSC's website.

In accordance with the *Nuclear Safety and Control Act*, a person must have a licence issued by the CNSC to decommission a reactor facility. This regulatory document, REGDOC-1.1.4, *Licence Application Guide: Licence to Decommission a Reactor Facility*, provides clarity on the requirements and guidance for preparing an application to obtain a licence to decommission a reactor facility in Canada.

This document will be used by applicants to prepare an application to undertake decommissioning activities at a reactor facility. For information on the implementation of regulatory documents and on the graded approach, see REGDOC-3.5.3, *Regulatory Fundamentals*.

The words "shall" and "must" are used to express requirements to be satisfied by the licensee or licence applicant. "Should" is used to express guidance or that which is advised. "May" is used to express an option or that which is permissible within the limits of this regulatory document. "Can" is used to express possibility or capability.

Nothing contained in this document is to be construed as relieving any licensee from any other pertinent requirements. It is the licensee's responsibility to identify and comply with all applicable regulations and licence conditions.

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Licence Application Guide: Licence to Decommission a Reactor Facility

1. Introduction

1.1 Purpose

This licence application guide clarifies the requirements for and provides guidance on the information needed to apply for a licence to decommission a reactor facility.

Following the information in this regulatory document will prepare applicants to submit the appropriate information to demonstrate that they are qualified and will make adequate provision for the protection of the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

1.2 Scope

This document will be used by applicants to prepare an application for a licence to decommission a reactor facility.

1.3 Relevant legislation

Appendix A maps a list of relevant clauses from the *Nuclear Safety and Control Act* (NSCA) and the regulations made under the NSCA to the related sections of this licence application guide.

The applicant must also comply with all applicable laws and regulations at all jurisdictional levels.

Note: Various requirements pertaining to the safety and control areas (SCAs) or other regulatory topics are addressed in each section of the regulatory document; however, applicants are responsible for ensuring all requirements for proposed activities under the NSCA and regulations are addressed in their applications.

1.4 CNSC contact information

A single point of contact from the CNSC is assigned to work with every licensee or applicant. This point of contact can provide the licensee or applicant with additional information or an explanation of the information contained within this document.

For additional information, see section 2.3, Completing the licence application.

To contact the CNSC, refer to the CNSC's website.

2. Licensing Basis and Process

This section provides information on the licensing basis and application process.

The decommissioning licence application and supporting documentation form the safety case for decommissioning the reactor facility and thus would form part of the licensing basis. The licence application and supporting documentation are to be controlled in the same manner as other parts of the licensing basis. Further information on the licensing basis is provided in REGDOC-3.5.3, *Regulatory Fundamentals* [2].

In most cases, policies, programs, processes, procedures, and other safety and control measures developed earlier in the lifecycle will continue to be used and adapted to support decommissioning.

The decommissioning licence application should update, or make reference to, those relevant documents previously provided to the CNSC, such as the application for the operating licence. REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant* [4] provides requirements and guidance on applying for a licence to operate a nuclear power plant.

2.1 Background

Under the *Nuclear Safety and Control Act* (NSCA), the following activities may be licensed for a reactor facility:

- site preparation
- construction
- operation
- decommissioning
- abandonment

Licences can be combined to permit multiple activities, for example, to operate and decommission. The applicant shall address all regulatory requirements pertaining to the activities for which a licence is being requested. In addition to the NSCA and the *General Nuclear Safety and Control Regulations*, the *Class I Nuclear Facility Regulations* provides requirements specific to a licence to decommission.

Decommissioning is defined in REGDOC-3.6, *Glossary of CNSC Terminology* [3], as the administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility, location or site where nuclear substances are managed, used, possessed or stored.

Decommissioning actions are the procedures, processes and work activities (for example, storage with surveillance, decontamination, dismantling or cleanup) that are taken to retire a facility, location or site from service with due regard for the health and safety of people and the environment.

REGDOC-2.11.2, *Decommissioning* [1], clarifies requirements and provides guidance regarding the typical phases of decommissioning, as follows:

- planning
- preparation
- execution
- completion

REGDOC-2.11.2 also outlines the documents that must be submitted to transition from operation to decommissioning.

2.2 Licensing process

REGDOC-3.5.1, *Licensing Process for Class I Nuclear Facilities and Uranium Mines and Mills*, [6] clarifies the licensing process.

The licensing process is initiated when the applicant submits a licence application. Applicants should ensure they have included sufficiently detailed information to allow the licensing process to proceed efficiently. In addition to the information provided in this REGDOC, the CNSC may request additional information during the licensing process.

Early engagement with CNSC staff (before submission of the application) is encouraged. For example, the applicant may submit a letter to notify the CNSC of the forthcoming application and provide some information on the scope and schedule of the proposed project.

2.3 Completing the licence application

The applicant is responsible for ensuring that the licence application demonstrates that the applicant:

- is qualified to carry on the licensed activity
- will make adequate provision to protect the health, safety and security of persons and the environment

The application shall include information on how the nuclear facility will adhere to any applicable provincial legislation or other applicable codes and standards.

The application shall cite the CNSC regulatory documents and the codes and standards that the applicant intends to apply and implement (these may form part of the licensing basis).

Guidance

The application may reference information that was previously submitted to the CNSC.

The application should clearly identify the location of all material within supporting documentation that addresses CNSC regulatory requirements.

The applicant may provide cross-references to other detailed sources, as appropriate.

Applicants are encouraged to discuss with the CNSC the appropriate version (publication date and revision number) of each document (regulatory document, code or standard) planned to be applied. CNSC staff may also provide supplemental guidance that the applicant should consider in the application. This pre-licensing communication is in alignment with REGDOC-3.5.1, *Licensing Process for Class I Nuclear Facilities and Uranium Mines and Mills* [6].

The application should provide a list of supporting documents and clearly identify which information has already been submitted to the CNSC. Appendix C provides a sample format for applicants to map their supporting documents to the safety and control area (SCA) framework. If the document version in the supporting information has changed since the previous submission, the applicant must provide the CNSC with the new version number, a copy of the new version, and a summary of major changes between the new version and the version previously reviewed by CNSC staff. Appendix D provides a sample format for listing revisions to the supporting documentation.

Note: The information provided in this document does not prevent applicants from proposing alternative ways to meet a requirement. However, any proposed alternative (including the use of codes and standards other than those referenced in this licence application guide) should appropriately address the complexities and hazards of the proposed activities. The applicant should be able to demonstrate (through supporting information and a code comparison) that the proposed alternative provides an equivalent or superior level of safety to Canadian standards.

3. Regulatory Requirements and Guidance

Structure and organization of the information

This licence application guide is organized according to the CNSC's SCA framework. However, the applicant may choose to organize the information using any structure.

Risk-informed graded approach

The CNSC's regulatory framework is primarily based on Canadian operational experience. However, the CNSC also takes into account other operating experience, such as the international experience of the International Atomic Energy Agency (IAEA) and the policies of other national regulators. Under the CNSC's framework, consistent with a risk-informed graded approach to regulating, applicants may propose alternative approaches to those suggested in this regulatory document. Where an alternative approach is used, the applicant should provide adequate justification. For additional information on the graded approach, see REGDOC-3.5.3, *Regulatory Fundamentals* [2].

3.1 Management system

3.1.1 General considerations

The application shall describe the proposed management system programs, processes and procedures that have been or will be put in place to protect health, safety and the environment, as well as a description of the organizational management structure.

Guidance

The application should refer to CSA N286, *Management system requirements for nuclear facilities*, [7] to meet the requirements for the SCA management system. If an application does not use CSA N286, the applicant shall provide the alternate standard used with justification.

The application should also describe the safety policies, the roles of external safety assessment organizations and the advisory committees that will guide the management of the organization that will carry out licensed activities.

3.1.2 Management system

The application should describe the management system and its implementation, including how it is compliant with the relevant requirements of CSA Group standard N286, *Management system requirements for nuclear facilities* [7], and considering the information in REGDOC-2.1.1, *Management System* [8].

The application should set out the process for establishing, implementing, assessing and continually improving the management system in line with the principles set out in CSA N286 [7], with sufficient detail to ensure safety and security.

The provisions of the management system extend to contracted workers (contractors) who are implementing activities under the oversight of the applicant organization.

The application should demonstrate that:

- the management system structure is clear, with a logical hierarchy of programs, processes and procedures
- processes are defined, with clear inputs and outputs
- roles and responsibilities are defined
- processes, procedures, measures and methods are clear and concise
- the delineation between decommissioning and operating processes, documentation, and the transition between them is clear

The application should describe how operational experience from decommissioning activities, from both internal and external sources, will be considered and addressed.

3.1.3 Organization

The application shall describe the applicant's organizational management structure insofar as it may bear on the applicant's compliance with the NSCA and the regulations made under it, including the internal allocation of functions, responsibilities and authority.

3.1.4 Oversight of contracted work

The application should describe how the applicant will ensure that contracted work is carried out to the required level of safety and quality consistent with CSA Group standard N286. [7] The applicant is qualified to oversee all design, safety analysis, decommissioning, research activities carried out by itself, or by contractors or subcontractors. Considerations include:

- ensuring that suppliers identify and categorize any deviations from specified requirements and that they refer the deviations to the appropriate authority
- ensuring suitable arrangements to mitigate the risk of counterfeit, fraudulent and suspect items entering the supply chain
- providing a detailed account of how the applicant will maintain active accountability for and control of all decommissioning activities to ensure that they meet regulatory requirements
- contractor's level of authority for site activities

3.1.5 Configuration management and change control

The application should describe the provisions to establish and maintain configuration from initial execution of decommissioning until completion of decommissioning, including:

- Demonstrating adherence to CSA Group standard N286.10, *Configuration management for high energy reactor facilities* [9]
- Ensuring compatible information management technologies between participating organizations for transferring, sharing and storing configuration information
- ensuring interface arrangements between participating organizations for reviews, approvals, releases, design changes, engineering field changes and non-conformances
- notifying the CNSC in cases where configuration changes affect or will affect the approved design and the licensing basis
- where necessary, obtaining approvals from the authority having jurisdiction

3.1.6 Safety culture

The application should demonstrate that the applicant's approach to fostering a healthy safety culture is in accordance with REGDOC-2.1.2, *Safety Culture*. [10]

3.2 Human performance management

The human performance management SCA covers activities that enable effective human performance through the development and implementation of processes that ensure a sufficient number of licensee personnel are in all relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.

3.2.1 General considerations

The application shall describe the qualifications, adequate numbers, skills and competencies required by workers.

An application shall include a description of the measures to ensure a sufficient number of workers in all job areas, and that workers have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.

Guidance

The applicant should describe the programs that aim to continuously improve human performance, to take steps to identify human performance weaknesses, and to remove human performance-related root causes of events. The application should include plans for implementing these programs.

The application should describe the workforce planning process, including measures for knowledge transfer, to ensure that workers are recruited and trained to fill each key role within the organization.

3.2.2 Human performance program

The application shall describe how the human performance program addresses and integrates the range of human factors that influence human performance, including but not limited to:

- the provision of qualified workers
- the reduction of human error
- organizational support for safe work activities
- the continuous improvement of human performance
- monitoring hours of work

3.2.3 Personnel training

The application shall describe a training system that is in accordance with REGDOC-2.2.2, *Personnel Training.* [11] The description should focus on any changes from previously submitted material.

The application shall describe any proposed changes to the applicant's overall training policy and governance documents related to the training system. The application shall include an overview of any changes to the initial and continuing training programs for all workers engaged in licensed activities, including workers employed as trainers and instructional staff. The application should describe any proposed changes in the processes established to:

- develop and manage documentation related to all phases of training, including analysis, design, development, implementation and evaluation
- manage training change control
- manage and track the status of worker qualifications

3.2.4 Personnel certification

The application shall describe any proposed changes to:

- the minimum shift complement
- the roles and responsibilities of certified workers
- the programs established for the training and qualification of certified workers
- the programs established for the certification examination and requalification testing of certified workers

Where the applicant proposes to modify the roles and responsibilities of certified workers involved in decommissioning activities, the application shall describe how the certification examination and requalification testing programs will be modified to reflect these changes.

Where decommissioning activities require that certified workers perform new duties, the application shall describe how the training, qualification, certification examination and requalification testing of certified workers will ensure that they possess the skills, knowledge, and safety-related attributes necessary to perform their new duties safely and competently.

Guidance

The application may include recommendations for modifying the personnel certification scheme. Any such proposal should be fully substantiated.

3.2.5 Work organization and job design

The application shall describe any anticipated changes to the work organization and job design, and provide an overview of anticipated timelines for implementation.

Guidance

The applicant should demonstrate that the staffing levels are adequate to support the safe decommissioning of the facility. The application should demonstrate how staffing levels consider the relevant information in REGDOC-2.2.5, *Minimum Staff Complement* [12].

3.2.6 Fitness for duty

For decommissioning activities, the application shall describe how the requirements for fitness for duty will be implemented in accordance with:

- REGDOC-2.2.3, *Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants* [13]
- REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue* [14]
- REGDOC-2.2.4, *Fitness for Duty, Volume II: Managing Alcohol and Drug Use* [15]
- REGDOC-2.2.4, *Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical and Psychological Fitness* [16]
- REGDOC-2.12.1, *High-Security Facilities, Volume I: Nuclear Response Force* [18]

The application should identify the oversight requirements for supervisors of certified and security workers from the perspective of fitness for duty.

3.3 Operating performance

The operating performance SCA includes an overall review of the conduct of the licensed activities and the activities that enable effective performance.

3.3.1 General considerations

The application shall describe the programs and their proposed measures, policies, methods and procedures for decommissioning the nuclear facility.

The applicant shall characterize the risks to health, safety and the environment that may be encountered by workers and the public during the conduct of the licensed activities. The applicant shall outline the strategy to be implemented (including development of mitigation measures) upon discovery of additional risks to the health and safety of the public that were not anticipated during the licence application process. Some examples are:

- noise hazards, primarily from blasting activities and operation of heavy machinery
- dust from overburden and rock removal and movement
- chemical hazards from fuel spills, and conventional chemicals used during the decommissioning of the facility
- mechanical hazards from activities such as excavation, earth movement and road building
- ground vibration and flying rock hazards from blasting activities
- electrical hazards from establishing electrical infrastructure
- transportation of materials to, from and within the site

Guidance

The application should include information (such as timelines and milestones) regarding the development, verification, validation and implementation of programs and procedures related to decommissioning.

The application should describe the processes used to ensure that the performance of the structures, systems and components (SSCs) have been assured from operation to decommissioning and when (in the future) major modifications are made to the facility.

Communication between the authority having jurisdiction, the applicant's organization, contracting organizations and other involved parties is a fundamental aspect of the decommissioning programs. The provisions for communication that link all these parties should be established and implemented early in the project. The application should document the appropriate tools when conflict resolution is needed.

For more information on demonstrating overall responsibility for decommissioning, see REGDOC-2.11.2, *Decommissioning* [1], and CSA N294, *Decommissioning of facilities containing nuclear substance* [17].

3.3.2 Procedures

The application should describe any changes to the programs and procedures in place to manage the key functions important to safety. If the applicant expects to implement a program later in support of decommissioning, the applicant should supply sufficient information to demonstrate how the program's development and implementation is planned, including the timelines and milestones that will apply.

3.3.2.1 Decommissioning program

The application shall:

- describe the decommissioning program to be implemented
- include information on how the applicant will exercise overall responsibility, document and implement their authority for the execution of decommissioning activities

Guidance

The decommissioning program should be well planned, controlled and properly documented, and interfaces with other programs should be documented, including the operation program.

The application should describe the processes and procedures that will be used to confirm that the facility's SSCs are decommissioned according to their design specifications, safety analysis and applicable regulatory requirements, codes and standards.

3.3.3 Safe operating envelope

The application shall describe how the requirements for safe operating envelope (SOE) will be implemented in accordance with REGDOC-2.6.2, *Maintenance Programs for Nuclear Power Plants* [19].

Note: Once the reactor facility has entered the execution of decommissioning phase and the reactor(s) have been defueled, the above-mentioned requirements related to SOE no longer apply. No further requirements related to SOE are relevant to the reactor facility in this state.

3.3.4 Accident and severe accident management and recovery

The application shall include, or describe any changes to, safety procedures, including emergency plans, which must be implemented.

The application should describe any changes to the emergency operating procedures (EOPs) for accident management during decommissioning, and any changes to the guidelines for a severe accident management (SAM) program in accordance with REGDOC-2.3.2, *Accident Management* [20].

3.4 Safety analysis

The safety analysis SCA covers maintenance of the safety analysis that supports the overall safety case for the facility. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards.

3.4.1 General considerations

As the hazards and risks of the facility greatly decrease once the reactor is defueled, the applicant can apply the graded approach, and use REGDOC-2.4.4, *Safety Analysis for Class IB Nuclear Facilities* [21], in describing the safety analysis for the defueled facility. The application shall include an updated safety analysis of the facility, including a deterministic safety analysis and a hazards analysis.

When operator action is considered as part of the safety analysis for decommissioning, the application shall demonstrate that the operators will have reliable information, sufficient time to perform the required actions and documented procedures to follow, and will have been trained.

Guidance

The application should also describe any changes to the programs and oversight in place to ensure that the safety analysis is carried out by technically qualified and appropriately trained individuals and is in accordance with the management system program supporting safety analysis.

For more information on safety analysis, see REGDOC-2.4.1, *Deterministic Safety Analysis* [22], and REGDOC-2.4.2, *Probabilistic Safety Analysis (PSA) for Reactor Facilities*, [23] when the reactor(s) have not been defueled. See REGDOC-2.4.4, *Safety Analysis for Class IB Nuclear Facilities,* [21] once the reactor facility enters the decommissioning phase and the reactor(s) have been defueled.

3.4.1.1 Safety assessment

The applicant shall perform a safety assessment to identify any radiological or non-radiological hazards to workers, the environment and the public from both routine decommissioning activities and credible or potential accidents during decommissioning.

3.4.1.2 Postulated initiating events

The application shall demonstrate that it has anticipated and considered all credible events for decommissioning that could lead to:

- radiation exposure to workers or to the public
- a release of significant amounts of nuclear substances
- a release of hazardous substances (such as hazardous chemicals) associated with the nuclear substances

The application shall describe how the safety analysis has considered the potential for specific hazards and common cause events on the site.

3.4.1.3 Deterministic safety analysis

The application shall include a deterministic safety analysis to evaluate and justify safety at the reactor facility in accordance with REGDOC-2.4.1, *Deterministic Safety Analysis* [22].

The application shall detail how the safety analysis will change over time as significant decommissioning activities are completed, when the reactor(s) have not been defueled and, applying the graded approach, in accordance with REGDOC-2.4.4, *Safety Analysis for Class IB Facilities* [21], when the reactor facility has entered the execution of the decommissioning phase and the reactor(s) have been defueled.

3.4.2 Hazard analysis

The applicant shall provide a hazard analysis that has been performed in accordance with the requirements of REGDOC-2.4.1, *Deterministic Safety Analysis* [22]. The application should detail any changes to the hazard analysis over time as significant decommissioning activities are completed.

Applying the graded approach, the application shall describe how the requirements and guidance found in REGDOC-2.4.4, *Safety Analysis for Class IB Nuclear Facilities* [21], regarding hazard analysis will be met when the reactor facility enters the execution of decommissioning phase and the reactor(s) have been defueled.

Guidance

The application should describe the analysis of all potential internal and external hazards that are natural and/or human-induced throughout decommissioning. Some examples are:

- work hazards during decommissioning
- natural external hazards including earthquakes, droughts, floods, high winds, tornadoes, abnormal surges in water level, extreme meteorological conditions and external fire (e.g., forest fire)
- human-induced external hazards that are identified in the site evaluation, such as airplane crashes, ship collisions and external explosion
- internal hazards including internal fires, internal floods, onsite transportation accidents, releases of hazardous substances from onsite storage facilities, and internal explosions

The application should describe the analysis of any potential combinations of the external hazards. It should also consider the potential interaction of external and internal hazards, such as external events that initiate internal fires or floods.

For a site with multiple reactors, the application should describe how the potential for specific hazards simultaneously affecting several reactors has been considered.

3.4.3 Severe accident analysis

When the reactor(s) have not been defueled, the applicant shall submit a severe accident analysis for decommissioning, in accordance with the requirements of:

- REGDOC-2.3.2, *Accident Management* [20]
- REGDOC-2.4.1, *Deterministic Safety Analysis* [22]

Guidance

The application should demonstrate the capability of the design to mitigate certain beyond-design-basis accidents (BDBAs) during decommissioning. The application should focus on any changes to the capability of the design due to end-of-life / fitness-for-service considerations (for example, due to corrosion or wear of SSCs).

Once the facility has entered the execution of the decommissioning phase and the reactor(s) have been defueled, this section no longer applies.

3.4.3.1 Event mitigation

The application shall provide the results of a review of event mitigation measures in accordance with the requirements of REGDOC-2.3.2, *Accident Management* [20].

3.5 Physical design

The physical design SCA relates to activities that impact the ability of SSCs to ensure that they remain effective over time. This area includes programs that ensure all equipment is available to perform its intended design function when called upon to do so.

A cross-reference linking legislative clauses to applicable sections of this guide is provided in Appendix A.

3.5.1 General considerations

The application should clearly identify the structures, systems and components (SSCs) that will continue to operate, those that will be removed and those that will be installed to facilitate decommissioning.

The application should include a general description of the overall current physical design and condition of the facility. The design information should reflect all notable design modifications and changes previously made. The application should describe any design features necessary to support decommissioning, as well as how the design basis will be met and maintained. The design work supporting decommissioning should be capable of addressing new information arising over time (for example, in the case of deferred decommissioning) and account for changes in the external environment (for example, intensity of precipitation due to climate change).

The application should describe the programs and oversight to ensure that design, construction, operation and dismantling activities for the facility are carried out by those who are qualified and will make adequate provisions for health, safety and protection of the environment.

The application should provide information on the design, construction, operation and dismantling support programs, including information demonstrating that the decommissioning of the facility:

- conforms to high standards
- behaves as predicted for novel aspects of the design, materials and use of equipment
- considers the latest developments in knowledge and technology
- maintains appropriate characteristics during its lifecycle
- ensures any required maintenance is facilitated and not inhibited

3.5.1.1 Description of structures, systems and components

For each modification to or new SSC for decommissioning, the application should describe in detail the characteristics, major components and design basis requirements (such as the functional and performance requirements associated with the design basis throughout decommissioning), including the following information:

- objective of the system and how it relates to the entire facility
- cross-cutting programs, such as:
  - quality assurance
  - human factors requirements
  - any requirements resulting from operational experience
- detailed elements of system design, including, as appropriate:
  - single line diagrams for electrical and instrumentation and control systems
  - physical location and isometric drawings
  - containment boundaries, including isolation requirements
- maintenance aspects, including:
  - surveillance
  - condition-based preventive maintenance

3.5.2 Site characterization

The application should refer to, or summarize, the information previously submitted in any relevant environmental review or licence application, such as environmental or impact assessments.

The application should focus on changes to site characteristics, and on assessing any effects to the applied for licensed activities from the updated information.

The application should describe:

- the site-specific hazard evaluation for external events (of human and/or natural origin)
- the arrangements for monitoring site-related parameters throughout decommissioning
- anticipated changes to exclusion zone authority and control over the proposed licence term

3.5.3 Design principles and requirements

The application should describe the design principles and requirements that cover the processes for the overall design for decommissioning the reactor facility.

3.5.3.1 Applicable regulations, codes and standards

The application should identify the applicable regulations, codes and standards for the design of modifications to or new SSCs to be used in the decommissioning activities. Any supplemental requirements should also be identified in the application.

3.5.3.2 Safety assessment and engineering evaluation

The applicant should demonstrate that a systematic process has been applied to decommissioning planning and facility design to ensure that decommissioning meets all relevant safety requirements and follows proven engineering practices at each stage. This may include:

- work hazard analysis during decommissioning
- failure modes and effects analysis with a consideration of additional loads resulting from decommissioning, structure and component deterioration, and heating from decay or gamma radiation
- dispersion prevention of radioactive materials, toxic materials and residual contamination
- assessment of system reliability and equipment function in the anticipated environment
- assessment of seismic events, as applicable

The application should summarize compliance with applicable design requirements (with reference to the original reports), including technical information on:

- material strength
- overpressure protection
- corrosion resistance
- environmental qualification
- reliability assessment
- resistance to electromagnetic and radiofrequency interference
- verification and validation of software

3.5.3.3 Identification of facility states

The application should identify all facility states during decommissioning in accordance with the section addressing facility or plant states in REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24].

The application should identify the key parameters and unique characteristics of each state or configuration, including the specific design provision for maintaining the configuration. The application should also provide the design envelope for decommissioning, if applicable.

3.5.3.4 Defence in depth

The applicant should describe the approach taken to incorporate the defence-in-depth concept into any designs required for the decommissioning of the facility. The design approach adopted should ensure that multiple and (to the extent practicable) independent levels and barriers for defence are

present to provide protection against accidents. For more information, see the sections addressing defence in depth in REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24].

3.5.3.5 Safety functions

The application should describe how the fundamental safety functions have been incorporated into designs required for the decommissioning of the facility, in accordance with the relevant section of REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24].

The application should also identify and provide a description of any additional safety functions, for example, heat removal from irradiated fuel in storage systems.

3.5.3.6 Safety classification of structures, systems and components

The safety classification of SSCs may change throughout decommissioning, and new non-reactor facilities supporting decommissioning may need to be classified. The application shall describe the approach adopted in the safety classification or re-classification of the SSCs and decommissioning support facilities. The approach shall be in accordance with applicable standards or regulatory requirements. Where no standard or regulatory requirement is available for the safety classification of a specific facility, sufficient justification for the proposed classification shall be provided for CNSC review and acceptance.

The application shall include criteria for deciding on the appropriate requirements for each class, such as:

- appropriate codes and standards to be used in the design, manufacturing, construction, testing and inspection of individual decommissioning support facilities
- in accordance with the appropriate standards or regulatory requirements:
  - system-related characteristics, such as the degree of redundancy, and reliability
  - environmental qualification, if applicable
  - seismic qualification
- availability requirements for SSCs for on-demand duty and for reliability
- quality assurance requirements

3.5.3.7 Human factors in design

As the state of the reactor facility changes frequently with decommissioning actions, human errors could occur. The application should describe how human factors in decommissioning are analyzed and planned to avoid injury or prolonged exposure to minimize human errors.

The application should include a list of human factors analyses and activities that were used in planning the decommissioning activities.

The application should describe how the decommissioning design elements consider human factors. It should describe the systematic process that has been followed, to incorporate consideration of human factors into the:

- specification, definition and analysis of requirements
- design activities
- verification and validation activities

For additional information on human factors design requirements, refer to:

- REGDOC-2.5.1, *General Design Considerations: Human Factors* [25]
- REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24]
- CSA N290.12, *Human factors in design for nuclear power plants* [26]

3.5.3.8 Robustness against malevolent acts

The application should demonstrate that the decommissioning activities have considered both physical protection concerns and transportation routes, in accordance with the requirements of:

- the *Nuclear Security Regulations*
- REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24]

The application should describe any proposed changes to the approach and provisions followed to ensure the physical protection of the reactor facility, including control areas, against internal and external sabotage.

Where changes are proposed, the description of the design approach should include:

- rules followed to establish the scope of threats
- justification for the specification of vital areas and the anticipated loads, for example, impact forces, blast pressure waves, internal induced vibrations, fires and missiles, on SSCs and buildings
- methodology used for assessing the vulnerability of the reactor facility, along with the measures selected to address these vulnerabilities and their consequences

Where changes are proposed, the application should also describe the provisions for protecting the capability of:

- monitoring and control of reactor facility parameters
- emergency management and response
- mitigation and recovery measures to ensure the safety of workers and the public

3.5.3.9 Safeguards in the design and design process

With respect to the design and design process, the information submitted should demonstrate that the decommissioning design and design process comply with the obligations arising from the safeguards agreements between Canada and the International Atomic Energy Agency (IAEA). For additional information on safeguards, see section 3.13 below.

3.5.3.10 Design changes

The application should describe the provisions being established for control and implementation of design and procedure modifications such that the decommissioning facility is maintained and modified within the limits prescribed by the design and analysis.

The application should also describe the processes for ensuring safe decommissioning, considering new information, experience, safety analyses and resolution of safety issues or correction of deficiencies.

The application should describe how design changes are assessed, addressed and accurately reflected in the safety analyses or analysis of record prior to implementation.

3.5.3.11 Feedback into the design and design process from operating experience and safety research

The application should describe how lessons learned from the decommissioning of other facilities or results of new research have been incorporated into the decommissioning designs. Considerations include:

- improved methods of construction and fabrication
- methods and tools used in design and analysis

For more information, see the section addressing operational experience in REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24].

3.5.4 Facility design

3.5.4.1 Considerations of decommissioning at the design phase

The application should describe how decommissioning was originally considered at the design stage of the reactor, if applicable, and identify any changes that are necessary due to how the facility was operated. Considerations include:

- the careful selection of materials to:
  - reduce activation
  - minimize the spread of activated corrosion products
  - ensure that surfaces are easy to decontaminate
  - minimize the use of potentially hazardous substances (e.g., oils, flammable and chemically hazardous materials and fibrous insulations)
- the optimization of the facility's design, layout and access routes to facilitate:
  - the removal of large components
  - easy detachment and remote removal of significantly activated components
  - future installation of decontamination and waste handling equipment
  - decontamination or removal of embedded components such as pipes and drains
  - control of radioactive material within the installation

3.5.4.2 Layout of main systems and equipment in the facility

Essential information required for decommissioning purposes at the end of the operational lifetime of the reactor should be identified. This information should be collected, maintained and revised throughout the operational lifetime of the reactor. Such information may include:

- siting
- final design
- "as-built" drawings
- models and photographs
- the construction sequence
- piping

- connections with the electrical grid, if applicable
- details of construction
- cable penetrations
- repairs or accepted deviations in components and structures
- location of reinforcement bars

The application should identify required functions of facilities throughout decommissioning and demonstrate that the reactor SSCs can withstand any demands (such as forces due to decommissioning and loads from decommissioning equipment and personnel) placed on them and that the SCCs can fulfil all safety functions required during decommissioning.

Accurate and complete information relating to the locations, configurations, quantities and types of radioactive materials and toxic substances remaining at the reactor installation should be maintained.

3.5.4.3 Facility dismantling

The application should provide the assessment of the availability of special services, engineering and decommissioning techniques required, including any decontamination, dismantling and cutting-edge technology as well as remotely operated equipment needed to complete decommissioning safely.

Each dismantling task should be analyzed to determine the most effective and safe method for its performance. Some considerations are as follows:

- equipment should be simple to operate, decontaminate and maintain
- effective methods for controlling airborne radionuclides should be implemented
- there should be effective control of discharges to the environment
- when underwater dismantling and cutting is used, provision should be made for water processing to ensure good visibility and assist in effluent treatment
- the effect of each task on adjacent systems and structures and on other work in progress should be evaluated
- waste containers, handling systems and routes should be defined before the start of dismantling work

If special tools and devices are needed for dismantling, these tools and devices should be tested in mock-up trials before use. The applicability of these techniques to the specific decommissioning project should be thoroughly assessed before selection. Where necessary, maintenance and periodic testing of these tools and devices should be factored into their deployment strategy.

In cases where the decommissioning process is similar to an earlier one approved by the CNSC, the applicant should provide a comparison that identifies and justifies the main improvements that have been incorporated into the currently proposed process.

3.5.5 Structure design

The application should present relevant information on the condition of the civil engineering structures to be decommissioned, with the level of detail specified in the applicable standards and regulatory documents. The application should describe in detail the:

- overall condition of the various structures

- types and activity of radioactive material contamination as well as the extent of the contamination
- effects of aging and deterioration of the structures on their condition
- decommissioning design and analysis procedures

The application should describe how the applicant intends to remediate structures, surfaces and subsurface soil at the site. The application should describe how an effective containment of contamination will be guaranteed to prevent the movement and dispersion of residual contamination in facilities undergoing decommissioning. Should temporary barriers be required for containment of any residual radionuclides, the design principles, design basis requirements and criteria, and applicable codes and standards used in the design should be described.

The application should include a level of detail that allows a full understanding of the methods and procedures the applicant intends to use for the licensed activities. The application should describe any inter-related decommissioning activities and their potential impact on safety. Interactions and interdependencies between several facilities located at the same site should be considered.

The application should demonstrate that the facility and its SSCs are of suitable continuing integrity to withstand any demands (for example, additional loads due to decommissioning equipment and personnel) placed on them during decommissioning, while continuing to fulfil all necessary safety functions for the duration of decommissioning. Also, the application should demonstrate that existing SSCs will continue to ensure associated safety functions for as long as is required by the decommissioning plan, with due account taken of aging and other degradation mechanisms, and of invasive decommissioning activities (for example, demolition of supporting walls, creation of a dusty environment, etc.).

The application should describe any new engineered SSCs required to fulfil safety functions that cannot be provided to an appropriate standard by existing SSCs, or that are needed because of the specific decommissioning activities to be executed. The level of detail provided should demonstrate their suitability and efficiency to meet the relevant safety requirements and criteria. These should be engineered based on appropriate engineering codes and standards.

The application should describe the range of anticipated structural loadings and performance requirements of new engineered SSCs, including design consideration for anticipated hazards.

The description of new engineered SSCs should include the design considerations (for example, applied loads, codes and standards, analytical tools, and material properties), the structural stability, the relative displacements, and the means of protection against internal and external events that were considered.

Containment systems should be retained as long as necessary and feasible. However, the containment may require changes during decommissioning as radioactive materials (spent fuel and operational waste) are removed from the installations or as the installation is modified (for example, in order to increase accessibility). When containment-related barriers or devices are removed or altered in the course of dismantling, acceptable confinement of residual radioactive material should be planned and demonstrated. Adequate containment should be planned and demonstrated when cutting and dismantling operations are carried out which may give rise to airborne contamination.

In the case of deferred dismantling, structures and systems may have to perform for longer periods than their accepted design life. This is important for active containment devices. The application should specify how proper maintenance and regular assessment of their integrity and efficiency will be performed. Similar considerations may also apply to non-radiological hazards that may arise in the installation, including those due to toxic materials, flammable liquids or vapours, heavy metals or asbestos.

3.5.6 System design

The applicant should present relevant information for any changes to system descriptions, pressure- or fluid-retaining SSCs, equipment environmental qualification, electromagnetic interference, seismic qualification, and fire safety/protection.

3.5.6.1 Equipment qualification

The applicant should identify any changes to processes and specifications for an equipment qualification program. The program should identify equipment service conditions. The application should demonstrate that equipment can perform its intended functions under the anticipated environmental conditions.

3.5.6.2 Electromagnetic compatibility

The applicant should demonstrate that instrumentation and electrical equipment of SSCs important to safety are protected from electromagnetic emissions, including electromagnetic interference (EMI)-induced faults for all facility states in which they are credited.

The information submitted should meet the requirements under section 7.9 of REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants*, [24] and demonstrate the capability, as specified in the design, of instrumentation and electrical equipment to function within the applied electromagnetic environment of the facility in different facility states, and without introducing significant electromagnetic disturbances to other equipment within the facility.

The application should include the layout strategies for grounding and shielding and should also provide EMI-qualified device handling and storage requirements.

3.5.6.3 Seismic qualification

The application should demonstrate whether and how decommissioning and deconstruction operations affect public and environmental safety. As for physical and radiological protection issues, in case of a design basis earthquake event and in case of a beyond design basis earthquake event, the application should describe how the safety of the public and of decommissioning staff will be guaranteed during and after such an event.

3.5.6.4 Fire protection system

The fire protection strategy is intended to document the risks to the public, workers and the environment in case of fire. The application should describe the fire protection strategy that will be implemented for each stage of decommissioning.

The fire protection strategy should demonstrate that fire protection systems and features will be maintained until fire risks have been reduced to a point that a protection feature is no longer required.

The application should demonstrate how the fire protection requirements for decommissioning outlined in CSA standard N293, *Fire protection for nuclear power plants* [27], are met.

3.5.6.5 Safety systems and safety support systems

If the reactor facility has not yet been defueled, the application should demonstrate that the safety systems ensure the safe removal of residual heat from the core and prevent exit of a guaranteed shutdown state.

3.5.6.6 Electrical power systems

The application should describe any change related to the electrical power systems and specify the required functions and performance characteristics of normal, standby, emergency and alternate power supplies.

It should also be demonstrated that the electrical power supplies are available and reliable with sufficient capacity to support the safety functions of the reactor(s) in their guaranteed shutdown state, as applicable.

For more information, see the sections addressing electrical power systems and the safety support system within REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24].

3.5.6.7 Instrumentation and control

The application should describe any changes to the instrumentation and control (I&C) systems used to support the safety case of the facility. The applicant should include provision of instrumentation to monitor and control reactor facility variables and systems over the respective ranges for operational states and accident conditions (including design-basis accidents (DBAs) and design-extension conditions (DECs)), to ensure reactor facility safety and to make sure that adequate information can be obtained on reactor facility status.

For more information, see the sections addressing instrumentation and control, human factors, and reliability and sharing within REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24].

3.5.6.8 Control facilities

The application should describe any changes to the control facilities, including the main control room, secondary control room and emergency support facilities. It should demonstrate that the control facilities are in accordance with sections addressing human factors and control facilities within REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants* [24].

3.5.6.9 Steam supply system

The applicant should provide information related to status of the steam supply system, including the steam lines, steam and feedwater system piping, and vessels and turbine generators throughout decommissioning. Further, the applicant should demonstrate that there is sufficient

margin in both the design and end-of-life condition such that pressure boundary limits are not exceeded.

3.5.6.10 Auxiliary systems

The application should describe any changes to the auxiliary systems, including their design basis requirements for decommissioning. It should also describe any other auxiliary system whose operation may influence safety but has not been covered elsewhere in the application (for example, communication and lighting systems).

3.5.6.11 Water systems

The application should provide information concerning any changes to the water systems associated with the reactor facility, including the station service water systems, the cooling system for reactor auxiliaries, the makeup system for demineralized water, the condenser cooling water system, the fire protection water supply systems, the ultimate heat sink and the condensate storage facilities.

The application should describe the safety significance and reliability requirements of each of the water systems, taking into account any claims made in the safety case for their availability to provide cooling.

3.5.6.12 Heat transfer to an ultimate heat sink

The application should describe any changes to the systems for transferring residual heat from SSCs important to safety to an ultimate heat sink.

3.5.6.13 Process auxiliaries

The application should describe any changes to the auxiliary systems associated with the reactor process system.

The application should also define how the guaranteed shutdown state (GSS) will be maintained through defueling.

3.5.6.14 Heating, ventilation, and air conditioning systems

The application should describe any changes to the reactor facility's heating, ventilation, and air conditioning systems.

3.5.6.15 Fuel handling and storage

The application should include a description of any changes to the fuel handling and storage systems.

3.6 Fitness for service

The fitness for service SCA covers activities that impact the physical condition of SSCs to ensure that they remain effective over time. This area includes programs that ensure all equipment is available to perform its intended design function when called upon to do so.

3.6.1 General considerations

The application shall describe the proposed measures, policies, methods and procedures to ensure all structures, systems and components (SSC) important to safety are available to perform their intended design function when called upon to do so. The application should identify all SSCs important to safety.

The application shall maintain an up-to-date list of SSCs important to safety. Such SSCs can progressively be declassified and dismantled as decommissioning progresses, provided that the facility's inspection and maintenance program is updated accordingly.

Guidance

Accurate and relevant records during the operating phase of the installation should have been kept to facilitate successful decommissioning. If these records have not been maintained, the record keeping should be initiated as soon as possible. The records may include details of the operating history of the reactor and details of maintenance and modifications to the facility.

During facility operation, the decommissioning plan should be reviewed and updated to be comprehensive with respect to technological developments in decommissioning and incidents that may have occurred (including abnormal events). All significant systems and structural changes during facility operation should be reflected in the process of ongoing planning for decommissioning.

3.6.2 Reliability program

The application should provide a description of the reliability program that meets the general approach of REGDOC-2.6.1, *Reliability Programs for Nuclear Power Plants*, [28] for systems in the facility whose failure affects the risk of a release of radioactive or hazardous material. Examples of topics include:

- setting reliability targets
- performing reliability assessments
- testing and monitoring
- regulatory reporting

3.6.3 Maintenance program

The maintenance program shall meet the applicable requirements of REGDOC-2.6.2, *Maintenance Programs for Nuclear Power Plants* [19].

Guidance

Additional information can be found in the section addressing the maintenance program in REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant.* [4]

3.6.4 Aging management program

The application shall describe the integrated aging management program that meets the applicable requirements of REGDOC-2.6.3, *Aging Management* [29].

Guidance

The application should include the aging management processes that ensure reliability and availability of required safety functions of SSC facilities or components during decommissioning.

If deferred dismantling is being considered for a prolonged period of time, due regard should be given to gradual deterioration of the structures, systems and components designed to act as barriers between the radionuclide inventory and the environment. This deterioration may also apply to systems that could be necessary during facility dismantling. The safety assessment should consider the requirement for maintenance, requalification tests or replacement of these systems (mechanical handling systems, ventilation, power supply and waste handling systems), and the implications of deterioration for safety should be evaluated. To implement safe enclosure, new systems and structures may have to be installed or existing systems and structures modified. The integrity of these new systems and structures should be assessed over the prolonged period of safe enclosure, using appropriate tools and techniques such as a sensitivity analysis.

3.6.5 Chemistry control program

The application should include a clearly defined chemistry control program that states the goals and objectives of the program at the different stages of decommissioning. The program should:

- preserve the integrity of SSCs important to safety which are needed until decommissioning is complete
- manage the harmful effects of chemical impurities and corrosion on SSCs
- implement the ALARA principle to manage the buildup of radioactive material and occupational radiation exposure
- limit the release of chemicals and radioactive material to the environment
- meet provincial and federal requirements related to handling and storage of hazardous materials

The application should describe the approach, based on industry research and operating experience, that will be used for the chemical control of reactor facility fluid systems important to safety during the transition from a fueled and operating state to a fully decommissioned state.

The application should include sufficient information and provide references to detailed documents to demonstrate how the chemistry program objectives will be achieved under the different stages of decommissioning.

The application should demonstrate that a chemistry surveillance program is established and implemented to verify the effectiveness of chemistry control in all systems important to safety. The surveillance program should be used to detect trends in parameters and to discover and eliminate undesirable effects and consequences of out-of-range chemistry parameters.

The application should include a timeline and milestones to ensure that the remaining matters related to chemistry control are in place and appropriately monitored.

Additional information can be found in the section addressing the chemistry control program in REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant* [4].

3.6.6 Periodic and in-service inspection and testing programs

The application should include periodic and in-service inspection and testing programs for the following SSCs:

- nuclear pressure boundary components
- containment components
- containment structures
- safety-related structures
- balance-of-plant pressure boundary components important to nuclear safety

Periodic and in-service inspection and testing programs require physical inspection and testing of SSCs to confirm that service-induced degradation has not increased the likelihood of a failure of a barrier against the release of radioactive substances, in accordance with the section addressing in-service testing, maintenance and repair in REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants.* [24]

Additional information can be found in the section addressing periodic and in-service inspection in REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant* [4].

3.6.7 Surveillance and maintenance program

Decommissioning may be carried out in a sequence of operations separated by one or more periods of time (storage with surveillance). Some of these time periods may consist of inactive and safe enclosure. Existing or new systems (including engineered barriers, ventilation, drainage, and waste storage containers) should be maintained with appropriate control measures. New systems include those to be installed to carry out deferred dismantling. A surveillance and maintenance program for buildings, structures and safety-related operational systems should be developed.

3.6.8 Containment

Containment is an important element to prevent the movement of residual radionuclides during decommissioning. Containment may change during decommissioning as radioactive materials are removed from installations or as the installation is modified. New confinement may be installed when existing containment related barriers or devices are removed or altered during dismantling. Care should be taken to retain containment systems as long as necessary and feasible. In the case of deferred dismantling, structures and systems may have to be in service for longer periods than their accepted design life. Care should be taken to ensure that proper maintenance is performed and to assess their integrity and efficiency regularly.

3.7 Radiation protection

The radiation protection SCA covers the implementation of a radiation protection program in accordance with the *Radiation Protection Regulations*. This program must ensure that contamination levels and radiation doses received by individuals are monitored, controlled and maintained as low as reasonably achievable (ALARA).

3.7.1 General considerations

The application shall describe the approaches for meeting the requirements of the *Radiation Protection Regulations* throughout decommissioning.

The application shall include a radiation protection program and should demonstrate how the design of the program is commensurate with the radiological hazards associated with the licensed activities, based on a thorough analysis of radiological hazards, radiation exposures and dose assessments, and an optimization of doses to conform to the ALARA principle. This applies to both normal operations as well as accident scenarios (including anticipated operational occurrences, DBAs and BDBAs/severe accidents).

Where detailed specific radiation protection provisions are to be changed or developed later on, the application should provide a proposed timeline and milestones for completion of this work.

The application should describe the proposed action levels along with the supporting technical justification. Applicants are responsible for identifying the parameters of their program that represent timely indicators of potential losses of control of the radiation protection program and providing a rationale justifying the corresponding action levels.

REGDOC-2.7.1, *Radiation Protection* [30], provides detailed guidance on meeting regulatory expectations for radiation protection, including the development of radiation protection programs and action levels.

3.7.2 Application of ALARA

The application shall describe how the radiation protection program ensures that effective dose and equivalent dose received by and committed to persons are ALARA, taking into account social and economic factors. The application should describe the application of ALARA, in accordance with the principles found in REGDOC-2.7.1, *Radiation Protection* [29].

3.7.3 Worker dose control

The application should describe how worker dose will be controlled, in accordance with the principles found in REGDOC-2.7.1, *Radiation Protection* [29]. Guidance on ascertaining worker

dose can be found in REGDOC-2.7.2, *Dosimetry, Volume I: Ascertaining Occupational Dose* [31].

3.7.4 Radiation protection program performance

The application should describe how radiation protection program performance will be evaluated, in accordance with the principles found in REGDOC-2.7.1, *Radiation Protection* [30].

3.7.5 Radiological hazard control

The application should describe how radiological hazards will be controlled, in accordance with the principles found in REGDOC-2.7.1, *Radiation Protection* [30].

3.8 Conventional health and safety

The conventional health and safety SCA covers the implementation of a program to manage workplace safety hazards to protect workers.

A cross-reference linking legislative clauses to applicable sections of this guide is provided in Appendix A.

Note: This SCA also addresses the requirements of the *Canada Labour Code Part II*, and the *Canada Occupational Health and Safety Regulations* or the applicable provincial occupational health and safety legislation.

3.8.1 General considerations

The application shall describe the program and implementation of policies to minimize risk to the health and safety of workers posed by conventional (non-radiological) hazards in the workplace, including the management of workplace safety hazards and the protection of personnel and equipment.

Guidance

The application should demonstrate that the occupational health and safety (OHS) program meets the requirements set out in all applicable provincial and federal legislation. The application should demonstrate how it ensures that all workers, including contractors, comply with the applicant's health and safety policies and procedures.

The application should demonstrate that the applicant has policies in place to:

- adequately execute the worker health and safety policies and procedures
- make adequate provision for the protection of the health and safety of persons, including provisions to:
  - demonstrate adequate oversight of the site OHS program
  - ensure compliance with applicable OHS regulations and requirements
  - ensure adequate OHS training of persons involved in OHS activities
  - have the capabilities for reporting, investigating and identifying root causes of incidents and significant events
- implement corrective actions to eliminate the identified root causes and verify completion to prevent recurrence

The application should demonstrate how it identifies potential OHS hazards, assesses the associated risks and puts in place the necessary materials, equipment, programs and measures to effectively manage, control and minimize those risks. The applicant should demonstrate that the handling and storing of hazardous materials complies with the Workplace Hazardous Materials Information System (WHMIS) program.

The application's description of the health and safety program should address periodic inspections, safety meetings, OHS committees and continuous improvement.

The application should describe the measures for monitoring accident severity rate, accident frequency, lost-time injuries, medically treated injuries and disabling injuries.

For more information, see REGDOC-2.8.1, *Conventional Health and Safety* [32].

3.8.2 Nuclear and hazardous substances

The applicant shall provide:

- the name, maximum quantity, and form of any nuclear substances to be encompassed by the licence
- the name, form, characteristics and quantity of any hazardous substances that may be on the site while the activity to be licensed is carried on

Guidance

The applicant should provide the scientific name of each nuclear and hazardous substance.

This information may be provided in summary format, such as by providing a table of the nuclear and hazardous substances and the information required for each substance.

3.9 Environmental protection

The environmental protection SCA covers programs that identify, control and monitor all releases of radioactive and hazardous substances and effects on the environment from facilities or as the result of licensed activities.

3.9.1 General considerations

The application shall demonstrate that the environmental protection measures:

- are commensurate with the level of risk associated with the activity
- account for uncertainty by keeping all releases to the environment as low as reasonably achievable and apply the best available technology and techniques that are economically available
- implement corrective actions to eliminate the identified root causes and verify completion to prevent recurrence

The application shall include a comprehensive set of environmental protection measures, including an environmental risk assessment, environmental management system and environmental monitoring program that meet all the requirements, as applicable, of REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [37], and draft REGDOC-2.9.2, *Environmental Protection: Controlling Releases to the Environment* [32], including their full range of associated CSA standards.

The application shall demonstrate compliance with the applicable provincial legislation during conduct of licensed activities.

3.9.2 Effluent and emissions control (releases)

The applicant shall propose licenced release limits and establish environmental action levels that are indicative of a potential loss of control of the environmental protection program or control measures The effluent and emissions control measures in place are used to inform the development of the licenced release limits and environmental action levels for the facility or activity being licensed.

3.9.3 Environmental management system

The application shall describe the environmental management system established to ensure protection of the environment throughout decommissioning.

3.9.4 Assessment and monitoring

The application shall describe the monitoring system established to cover all environmental monitoring activities on the site during decommissioning. For more information, see:

- REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [37]
- Draft REGDOC-2.9.2, *Environmental Protection: Controlling Releases to the Environment* [38]
- CSA N288.4, *Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills* [33]
- CSA N288.5, *Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills* [34]
- CSA N288.6, *Environmental Risk Assessments at Class I Nuclear Facilities and Uranium Mines and Mills* [35]
- CSA N288.9, *Guideline for Design of Fish Impingement and Entrainment Programs at Nuclear Facilities* [36]

The application should also update the description of environmental components, where applicable, that were included in the application to determine the current and anticipated future environmental baseline characteristics of the site and the surrounding area.

3.9.5 Protection of people

The application shall identify and describe all the radiological and non-radiological aspects of site activities that could have environmental effects, including exposure to members of the public during decommissioning activities.

Guidance

The application should provide the technical basis for calculating the dose to the public from licensed activities.

For existing licensees, the application should include the maximum effective doses to the public as a result of the decommissioning activities conducted. For new applications, the maximum predicted effective doses to the public should be included.

3.9.6 Environmental risk assessment

The application shall include an environmental risk assessment (ERA). The applicant shall review the most recent ERA that was developed for the site and update it as necessary to reflect changes to the site or the situation.

3.10 Emergency management and fire protection

The emergency management and fire protection SCA covers emergency plans and emergency preparedness programs that exist for emergencies and for non-routine conditions. This area also includes any results of participation in exercises.

Note: This SCA includes conventional emergency and fire response. Fire protection operations, design and analysis are discussed in the appropriate operating performance, safety analysis or physical design SCA.

3.10.1 General considerations

The application shall describe an emergency preparedness program that meets the requirements of REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response.* [40]

Guidance

The application should describe the preparations that have been made to ensure that onsite and offsite emergencies and severe accidents will be managed safely and effectively.

3.10.2 Nuclear emergency preparedness and response

The application should describe how the nuclear emergency program encompasses both emergency preparedness and emergency response measures.

The application should describe how the applicant intends to conduct emergency exercises and drills as outlined in their nuclear emergency plan.

The application should describe any natural or artificial events within and beyond the design basis that would affect emergency management requirements (for example, forest fires, earthquakes, extreme weather conditions, toxic fume clouds, explosions or airplane crashes).

3.10.3 Conventional emergency preparedness and response

The application should describe all non-radiological, non-routine conditions at the facility for which the emergency preparedness program has been established. The description should include details about which provisions exist on site and which provisions involve off site response support.

3.10.4 Fire emergency preparedness and response

The application shall demonstrate how the fire protection requirements for decommissioning outlined in CSA Group standard N293, *Fire protection for nuclear power plants* [27], are met.

The application should describe how the fire protection program and the fire hazard assessment are maintained for all stages of decommissioning commensurate with the changes in fire hazards and the potential release of hazardous and radiological materials to the environment.

3.11 Waste management

The waste management SCA covers internal waste-related programs that form part of the facility's operations up to the point where the waste is removed from the facility to a separate waste management facility, location or site. This area also covers the planning for decommissioning.

3.11.1 General considerations

The application shall describe the overall waste program to address waste generated during the decommissioning of the reactor facility and its transfer to the adjacent waste storage facility or another authorized facility, location or site.

The waste management program shall address both conventional and radioactive waste and shall contain the information listed in the section addressing the waste management program in REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste* [41].

Guidance

In general, an update of the existing waste management program for the operational stage of the facility should be performed, with consideration given to the additional materials and waste categories associated with decommissioning. The waste management program should anticipate periods in which the processing of high volumes of waste will be necessary and should propose means of minimizing any impacts of such waste processing on the decommissioning actions or the operations of other facilities at a multifacility site.

The application should describe how the applicant will implement and maintain associated programs and procedures to support the waste management program (e.g., waste characterization). These programs and procedures should be commensurate with the risk of the waste streams being managed.

For more information, see:

- REGDOC-2.11, *Framework for Radioactive Waste Management and Decommissioning in Canada* [42]
- REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste* [35]
- REGDOC-2.11.2, *Decommissioning* [1]
- CSA Group standard N292.0, *General principles for the management of radioactive waste and irradiated fuel* [43]
- CSA Group standard N292.3, *Management of low- and intermediate-level radioactive waste* [44]
- CSA Group standard N292.4, *Storage of radioactive waste and irradiated fuel* [45]
- CSA Group standard N292.5, *Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances* [46]
- CSA Group standard N292.6, *Long-term management of radioactive waste and irradiated fuel* [47]
- CSA Group standard N292.8, *Characterization of radioactive waste and irradiated fuel* [48]

- CSA Group standard N294, *Decommissioning of facilities containing nuclear substances* [17]

3.11.2 Waste management practices

The application shall identify the main sources of solid, liquid and gaseous radioactive and hazardous waste within the facility. The measures taken for the safe management and disposal of this waste throughout decommissioning shall be described.

The application shall describe the types, quantities and volumes of radioactive and hazardous waste that will be accumulated, and how waste will be classified, categorized and separated within the storage areas.

The application shall describe the provisions for safe handling of radioactive and hazardous waste of all types generated during decommissioning.

Where the application includes the consolidation of the waste management facility into a decommissioning licence, the application shall describe the process for handling, processing, storage, transfer and/or disposal of the radioactive waste, including the management of spent fuel from the spent fuel bay to the dry storage facility.

The application shall describe the potential need for specialized systems to deal with issues of storage in both the near and longer term (for example, cooling, containment, volatility, chemical stability, reactivity, retrievability and criticality). Any system(s) already in place shall be described.

The application shall describe how common safety considerations for waste storage are addressed, including:

- immobility and energy state of the radioactive material
- stability and resistance to degradation of the waste form and container
- multi-barrier containment approach
- waste package life and retrievability
- facility resistant to hazards, with minimized need for monitoring and maintenance
- appropriate robustness for the storage period, prior to disposal activities

With respect to the management of spent nuclear fuel, the application shall describe how the program reflects the fundamental safety concerns related to criticality, exposure, heat control, containment and retrievability.

The application shall also describe the measures taken to condition the waste produced during decommissioning and describe the procedures for processing the waste.

The application shall describe how the applicant will account for interdependencies among all steps in radioactive waste management, as appropriate.

3.11.3 Waste characterization

The application shall demonstrate that waste characterization will be performed at appropriate steps in the management of radioactive waste that meets the requirements of REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste* [35].

3.11.4 Waste minimization

The application shall describe the measures that will be taken to minimize radioactive and other hazardous waste generated during decommissioning, with consideration of the waste hierarchy, in accordance with REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*. [35]

3.11.5 Decommissioning plan

The application shall include a detailed decommissioning plan that is in accordance with REGDOC-2.11.2, *Decommissioning* [1].

Guidance

For more information on decommissioning plans, see CSA Group standard N294, *Decommissioning of facilities containing nuclear substances* [17].

3.12 Security

The security SCA covers the programs required to implement and support the security requirements stipulated in the regulations, the licence, orders, or expectations for the facility or activity.

A cross-reference linking legislative clauses to applicable sections of this guide is provided in Appendix A.

3.12.1 General considerations

During the decommissioning phase, the licensee shall revise their nuclear security plan and its security program. The revised security program shall meet the requirements of:

- REGDOC-2.1.2, *Safety Culture* [10]
- REGDOC-2.2.4, *Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical and Psychological Fitness* [16]
- REGDOC-2.12.1, *High-Security Facilities, Volume I: Nuclear Response Force* [18]
- REGDOC-2.12.1, *High-Security Sites, Volume II: Criteria for Nuclear Security Systems and Devices* [49]
- REGDOC-2.12.2, *Site Access Security Clearance* [50]
- REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material* [51]
- CSA Group standard N290.7, *Cyber security for nuclear facilities* [52]

The applicant's security provisions shall address the measures necessary to protect the reactor facility and vital areas throughout the changing conditions at the facility during decommissioning.

The application shall provide proposed timelines and milestones for changes to nuclear security systems and measures during decommissioning. This shall account for the reduced numbers of access points and nuclear security measures at the facility, the reduction of vital areas and the reduction of nuclear security officers from the site during decommissioning.

The application shall describe the security program and nuclear security plan that will encompass all licensed activities, including a description of:

- the threat risk assessment (TRA)
- the cyber security program
- response arrangements
- security practices
- drills and exercises

The application shall include a revised TRA to evaluate any threats, risks or vulnerabilities to the facility.

Guidance

The application should provide information related to:

- site access control and measures to prevent loss or illegal use, illegal possession or illegal removal of the nuclear substance
- prescribed assets (equipment or prescribed information)
- the proposed measures to prevent acts of sabotage or attempted sabotage at the nuclear facility
- specific information related to meeting the requirements for high-security sites and the transportation of Category I, II, or III nuclear material

The application should describe how vital areas within the nuclear facility are protected against design-basis threats and any other credible threats identified in the TRA. The application should contain a site plan that conforms to the *Nuclear Security Regulations*.

REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material* [51], provides information on preparing and submitting a written transportation security plan and on what information should be included with a licence application (specific topics include how security information should be organized and the administrative procedures to be followed when providing the security program description).

Additional information can be found in:

- IAEA NSS No. 35-G, *Security during the Lifetime of a Nuclear Facility* [53]
- IAEA NSS No. 17-T, *Computer Security Techniques for Nuclear Facilities* [54]
- IAEA NSS No. 33-T, *Computer Security of Instrumentation and Control Systems at Nuclear Facilities* [55]

3.12.2 Facilities and equipment

The application shall describe how the security program ensures:

- nuclear security measures and systems provide deterrence, detection, assessment and delay functions
- operational readiness is maintained

The applicant shall update the engineered safety barriers that protect against malevolent acts and how these provisions are documented as part of a managed program or process within the management system. The application shall describe the process for reporting on changes in design, analysis or procedures that are credited for the protection against malevolent acts, in accordance with the *Nuclear Security Regulations*.

The application shall describe the access control of visitors, workers and vehicles to the protected area and vital areas during decommissioning. The application shall also describe the control mechanisms, which may include access control devices, identification badges, escorted access, and detection and assessment systems.

3.12.3 Response arrangements

The application shall update the security program and contingency plan to ensure that onsite and offsite response arrangements provide effective response to unauthorized removal of nuclear substances or to the sabotage of nuclear facilities. The application shall account for the reduced number of nuclear security officers during decommissioning. A sufficient number of security personnel will need to be maintained to ensure adequate monitoring, assessment and protection of the facility and its nuclear material.

The applicant shall update the site tactical deployment plan that describes how the protection arrangements with the offsite response force are exercised and tested.

When applicable, the applicant shall demonstrate how the program ensures that a nuclear response force is in place and authorized to prevent and detect unauthorized entry into a protected, vital or inner area, including unauthorized entry of weapons and explosive substances.

The application shall demonstrate that the communications systems are implemented commensurate with the potential threats, risks and vulnerabilities.

3.12.4 Security practices

The application shall describe the measures in the security program that ensure administrative and technical measures are implemented, maintained and documented in a security program.

The application shall describe how access to prescribed equipment and information is limited to those workers having the appropriate security clearance and a valid need-to-know basis.

The application shall describe how sensitive information, including prescribed information, will be protected. The application should also describe the measures taken to properly dispose of any sensitive or prescribed information.

The application shall describe how safety culture, in particular security culture, as defined in REGDOC-2.1.2, *Safety Culture* [10], will be fostered maintained, promoted and supported during decommissioning.

3.12.5 Drills and exercises

The application shall describe measures in place to ensure response workers are trained and capable of performing the duties described in section 30 of the *Nuclear Security Regulations* and in accordance with training requirements specified in REGDOC-2.12.1, *High-Security Facilities, Volume I: Nuclear Response Force* [18]. The application shall describe realistic drills and exercises to test the performance of security systems, processes, procedures and workers.

The application shall describe the duties of the security officers. The applicant shall demonstrate that the security officers are adequately equipped, trained and qualified to perform their assigned duties and tasks.

The application shall describe the process that ensures that the required documentation and necessary medical, physical and psychological certification of a person is obtained before that person can be authorized to act as a nuclear security officer. This includes firearms proficiency and other qualifications listed under REGDOC-2.12.1, *High-Security Facilities, Volume I: Nuclear Response Force* [18].

The application shall describe the security drills and exercises program to meet CNSC requirements.

3.12.6 Cyber security

The application shall describe how the cyber security program ensures that cyber essential assets (CEAs) are protected from cyber attacks in accordance with CSA Group standard N290.7. CEAs are cyber assets that perform or impact nuclear safety, nuclear security, emergency preparedness and safeguard functions.

Guidance

The application should describe:

- the assessment process to evaluate the effect of adding, replacing or removing existing CEAs and/or nuclear security functions which affect CEAs. The assessment process should include an approach to evaluate adding compensatory measures in place if the decommissioning of a system and/or security function reduces the effectiveness of cyber security measures
- the process for the secure destruction of any digital assets containing sensitive information that cannot be declassified

3.13 Safeguards and non-proliferation

The safeguards and non-proliferation SCA covers the programs and activities required for the successful implementation of the obligations arising from the Canada/International Atomic Energy Agency (IAEA) safeguards agreements as well as all other measures arising from the *Treaty on the Non-Proliferation of Nuclear Weapons* (IAEA INFCIRC/140) [56].

Note: It also addresses the requirements on the Government of Canada from the following safeguards agreements:

- *Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (IAEA INFCIRC/164) [57]
- *Protocol Additional to the Agreement Between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (IAEA INFCIRC/164/Add.1) [58]

3.13.1 General considerations

The applicant shall provide a description of any changes to the arrangements made by the applicant to permit the CNSC to discharge Canada's obligations and provide information to the IAEA. The application shall describe how any changes to the arrangements address the requirements in REGDOC-2.13.2, *Import and Export* [59], and REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy* [60].

Guidance

The application should describe any changes to measures related to site buildings and structures, operational parameters and the flow and storage of nuclear material, from the reactor facility's decommissioning phase and through to its eventual abandonment, that could impact the implementation of safeguards measures.

For reactor facilities, the non-proliferation program is limited to the tracking and reporting of international obligations and origins of nuclear material.

For the purposes of the application and its review, document ownership will vary between the IAEA, the CNSC and the applicant:

- the IAEA is responsible for the generic safeguards approach
- the CNSC is responsible for:
  - coordinating with the IAEA in developing the generic safeguards approach
  - negotiating the safeguards arrangements with the IAEA for the facility's decommissioning
  - monitoring the applicant's compliance with safeguards documents, requirements and obligations
- the applicant is responsible for establishing and implementing the safeguards program

3.13.2 Nuclear accountancy and control of material

The application should describe to the CNSC and the IAEA any detailed changes in the way that the applicant's program ensures the collection, storage and reporting of information about the inventory and transfer of nuclear material subject to safeguards. The application should describe how any changes to measures ensures that nuclear materials are tracked and reports are submitted to the CNSC on the inventory and transfer of nuclear material and the application of IAEA safeguards.

The application should describe provisions for timely submission of accurate reports and information on nuclear material. Further information is available in REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy* [55].

3.13.3 Access and assistance to the IAEA

The application should describe how the program ensures that the IAEA is able, upon request, to access the facility for inspections and other verification activities. Additionally, the application should describe how the program ensures that such activities are supported by facility workers and resources.

The application should describe how the effectiveness of safeguards procedures, and assistance to the IAEA for site access and inspections, are reviewed.

3.13.4 Operational and design information

The application should describe any changes to:

- the processes that collect, store and report relevant operational information to the CNSC and the IAEA
- how the program ensures that updates provided under the *Additional Protocol* [58] are reported to the CNSC

The application should also describe methods for developing and implementing an appropriate safeguards approach based on the reactor facility's specific designs.

The application should describe how any changes to the program engage both the CNSC and the IAEA to ensure that the safeguards approach is suitable for its purpose.

The application should describe provisions for the submission of:
- annual operational information
- accurate design information of structures
- processes and procedures

3.13.5 Safeguards equipment, containment and surveillance

If the safeguards approach for decommissioning proposed by the IAEA includes safeguards equipment or seals, the applicant should demonstrate that adequate resources (such as power and lighting) are provided to IAEA equipment and that measures are in place for the protection of IAEA equipment and seals.

3.14 Packaging and transport

The packaging and transport SCA covers programs for the safe packaging and transport of nuclear substances to and from the licensed facility.

Note: It also addresses the requirements of the *Transportation of Dangerous Goods Regulations*.

3.14.1 General considerations

The application shall describe any changes to the security measures listed in section 5 of the *Nuclear Security Regulations* and provide a written transport security plan for the transport of category I, II or III nuclear material.

3.14.2 Package design and maintenance

The application should describe any changes to how the program ensures that all shipping packages are designed and maintained for the protection and containment of the quantities transported.

The application should describe any changes to elements such as package certification, package testing, inspection and maintenance.

3.14.3 Packaging and transport program

The application shall describe any changes to the measures in place to ensure compliance with all requirements of the *Packaging and Transport of Nuclear Substances Regulations, 2015* and the *Transportation of Dangerous Goods Regulations*.

3.14.4 Registration for use

The application should describe any changes to the measures in place to ensure that certified packages are registered for use prior to transport.

4. Other Regulatory Areas

The applicant's policies, programs, processes and procedures shall also address other matters of regulatory interest, such as public information and disclosure programs, financial guarantees and Indigenous engagement.

Guidance

A cross-reference linking legislative clauses to applicable sections of this guide is provided in Appendix A.

4.1 Reporting requirements

The application shall describe how the reporting and trending programs, processes and procedures meet the applicable requirements of REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants* [61], when the reactor(s) have not been defueled.

Guidance

Applicants should apply the graded approach and use REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills* [62], when the reactor facility has entered the execution of decommissioning phase and the reactor(s) have been defueled.

4.2 Public information and disclosure program

The application shall describe how any changes to the public information and disclosure program meet the requirements in REGDOC-3.2.1, *Public Information and Disclosure* [63].

The description shall include how and with what tools the applicant will communicate with the public, particularly with those persons living in the vicinity of the site, and the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the decommissioning of the facility.

4.3 Indigenous engagement

The CNSC, as an agent of the Crown, has the responsibility for fulfilling Canada’s legal duty to consult, and where appropriate to accommodate Indigenous peoples when the CNSC’s decisions may have had adverse effects on potential or established Indigenous or treaty rights. The CNSC is committed to meaningful ongoing engagement and consultation with Indigenous groups who have an interest in facilities and activities regulated by the CNSC.

The applicant shall describe how its Indigenous engagement plan and activities meet the requirements in REGDOC-3.2.2, *Indigenous Engagement* [64], which clarifies requirements and provides guidance for applicants and licensees whose proposed projects may raise the Crown's duty to consult. While the CNSC cannot delegate its obligation, it can delegate procedural aspects

of the consultation process to licensees, where appropriate. The information collected, and measures proposed, by applicants and licensees to avoid, mitigate or offset adverse effects on Indigenous or treaty rights may be used by the CNSC in meeting its obligations for consultation.

4.4 Cost recovery and financial guarantees

Each reactor facility licensee in Canada has the prime responsibility for the safety of its facility, including providing adequate financial resources to support the safety of each reactor facility throughout its life.

4.4.1 Cost recovery

A decommissioning licence for a reactor facility is subject to the requirements of Part 2 of the *Canadian Nuclear Safety Commission Cost Recovery Fees Regulations*. Applicants are responsible for payment of the annual fees determined by CNSC. Payments are normally requested on a quarterly basis and are due to the Receiver General of Canada.

The applicant should discuss the details of the amount and payment plan with the CNSC.

For additional information, refer to the *Canadian Nuclear Safety Commission Cost Recovery Fees Regulations*.

4.4.2 Financial guarantees

The application shall describe the financial guarantees for the costs of decommissioning the reactor facility according to the NSCA and the *General Nuclear Safety and Control Regulations*.

Guidance

The applicant should also provide a cross-reference to the supporting document regarding the value and form of the financial guarantee.

For more information about financial guarantees and licensing, consult REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities* [65].

5. Standard Application Information

A cross-reference linking legislative clauses to applicable sections of this document is provided in Appendix A.

The licence application shall include the following general information to satisfy the regulations, and should also include some additional general information, as listed in the subsections below.

Guidance

The applicant may identify appropriate information and documents as being subject to confidentiality requirements.

5.1 Statement of purpose

An applicant must complete a licence application when:

- requesting a new licence
- renewing, amending, replacing or revoking an existing CNSC licence

The application provides details for the licence, which will consequently authorize only specified activities. The applicant must provide:

- a description of any nuclear facility and any prescribed equipment or information to be encompassed by the licence
- information about all activities to be licensed, as described in any of paragraphs 26(a) to (f) of the NSCA, and their purpose

For a licence renewal, the activities requested in this application must match those currently listed on the existing CNSC licence.

Guidance

This information may be provided in summary format; for example, by listing the facilities, equipment or information.

5.2 Licence period

The applicant should state the requested licence period. The applicant may request a specific licence period to match planned activities or anticipated change in status.

Note: The CNSC issues licences of varying durations. This enables regulation of reactor facilities in a risk-informed manner by adjusting the licence period in consideration of the licensee's previous performance and findings from the compliance verification activities.

5.3 Description of site

The application must contain a description of the site of the activity to be licensed, including the location of any exclusion zone and any structures within that zone.

For Class I nuclear facilities, the applicant must provide plans showing the location, perimeter, areas, structures and systems of the facility.

5.4 Applicant's name and business address

The applicant must provide the applicant's name and business address.

The name must be that of the person or organization applying for the licence, as it appears on the proof of legal status documentation, such as the proof of incorporation or sole proprietorship.

The business address must be the legal, physical address of the applicant's head office, including the complete street name and number, city, province or territory, and postal code. A post office box number is not acceptable.

Guidance

The applicant should name an individual only if that person is a sole proprietor or will be solely responsible for the licence.

5.5 Mailing address

If the mailing address is different from the business address, the applicant must provide the mailing address, including the complete street name and number, city, province or territory, and postal code.

If no address is provided here, the licence issued in response to the application will be mailed to the head office address. A post office box number is acceptable as a mailing address.

5.6 Authority to act

The applicant must notify the Commission of the persons who have authority to act for them in their dealings with the Commission.

Guidance

The applicant should provide a list of names, positions and contact information of all persons who are authorized by the applicant to interact with the CNSC.

Note: The applicant may request, for security reasons, that this information be subject to confidentiality requirements.

5.7 Applicant authority

The applicant must provide the name, title and contact information (address, email address and telephone number) of the individual who has the legal signing authority for the application.

The signature of the applicant authority indicates that all statements and representations made in the application and on supplementary pages are binding on the applicant.

5.8 Proof of legal status

Applicants should provide proof of legal status by appending a proof of incorporation, corporation number or charter. When submitting an application to renew, a revised proof of legal status should be provided if the applicant's original organization name has changed.

If the applicant is a corporation, the application should include the following information:

- corporation's legal name
- corporation number
- date of incorporation
- registered office address (if different from the head office address)

5.9 Owner or authority for the site

The applicant must provide evidence that the applicant is the owner of the site or has authority from the owner of the site to carry on the activity to be licensed.

5.10 Other information

The applicant shall include a description and the results of any tests, analyses or calculations performed to substantiate the information included in the application.

If this information supports the safety case for a facility or substantiates the analyses for assumptions made in the safety report, it will become part of the licensing basis.

Guidance

If applicable, the applicant should describe the relationship of this application to any previous licences issued by the CNSC for this facility, including any changes to the licensing basis that were included in previous licences.

The applicant should reference any other CNSC licences that apply to the use of other nuclear substances and authorized activities conducted at the facility, such as licences for nuclear substances and radiation devices, dosimetry service, and import/export of controlled nuclear and nuclear-related substances, equipment and information.

Where applicable, the applicant may provide supporting information, including:

- the results of experimental programs, tests or analyses (for example, results of manufacturers' material tests and qualification data)
- those that have been submitted to, received from or published by a foreign national regulatory body
- information published by a national agency or an international nuclear agency

The applicant should also provide a cross-reference to any permits or certificates issued by any regulatory body for this site. Some examples are:

- a permit issued under the *Species at Risk Act*, authorizing the person to engage in an activity affecting a wildlife species listed in the act, any part of that species' critical habitat or the residences of that species' individuals
- a permit from a provincial or territorial government for an activity that could affect an endangered or threatened plant or animal and its habitat
- a certificate issued by Fisheries and Oceans Canada authorizing an impact on fish habitat

5.11 Cost recovery

Where applicable, the application must be accompanied by the appropriate regulatory fee as outlined in the *Canadian Nuclear Safety Commission Cost Recovery Fees Regulations*. Any questions can be addressed to the CNSC Cost Recovery Advisory Group.

5.12 Financial guarantees

The application must describe the financial guarantees for the costs of decommissioning the facility or licensed activity according to the NSCA and the *General Nuclear Safety and Control Regulations* (GNSCR).

Guidance

The applicant should also provide a cross-reference to the supporting document regarding the value and form of the financial guarantee.

For more information about financial guarantees and licensing, consult REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities* [60].

5.13 Billing contact person

The applicant must provide the following information for the person responsible for licence fee payments:

- name
- position
- contact information (email, telephone, facsimile)
- mailing address, if different from the business mailing address

5.14 Notification

The applicant must notify the CNSC within 15 days of any changes to the contact names identified in the application.

5.15 Structuring the licence application

The application may be completed in either of Canada's official languages. The applicant may choose to organize the information in any structure. However, the applicant is encouraged to organize the licence application according to the CNSC's SCA framework to facilitate the CNSC's review. The CNSC uses SCAs as the technical topics to assess, review, verify and report on regulatory requirements and performance across all regulated facilities and activities, as outlined in REGDOC-3.5.3, *Regulatory Fundamentals*, [2] This REGDOC also contains information on licensing and certification, including the licensing basis and other key regulatory concepts, such as the graded approach.

5.16 Submitting the licence application

The applicant must ensure that the application is complete, dated and signed by the appropriate authority, and that all supporting documents are clearly identified and cross-referenced and submitted in a secure format to the CNSC Registry at registry-greffe@cnsc-ccsn.gc.ca.

The applicant must keep a record of all licence information, as required by section 27 of the GNSCR.

Prescribed information, such as details of the security program, shall be transmitted only by secure means, such as letter mail or encrypted secure memory devices. It is prohibited to submit prescribed information via unencrypted email.

Guidance

If the applicant chooses to submit the licence application in printed format, two signed and dated printed copies of the application should be mailed to:

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

All information submitted is subject to the *Access to Information Act* and the *Privacy Act*. The applicant must identify, with justification, any material that is subject to confidentiality requirements and not suitable for public disclosure. Any such information is also made available to the public upon request, in total or in a redacted form, according to the CNSC's legal obligations.

Guidance for the protection and transmission of prescribed information can be found in REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material*. [51] Additional guidance, context and recommended practices on handling, submitting and transmitting assets considered security-sensitive (such as prescribed information) can be found in the Treasury Board of Canada Secretariat *Policy on Government Security* [66] and its related directives (which can be accessed through links on the same website).

5.17 Existing licensing status

If a facility on the site is currently licensed by the CNSC, or another licence application is pending, the applicant should provide a description of the licensing status.

5.18 Similar facilities

If applicable, the applicant should provide a list of any similar facilities owned or operated by the applicant that have been assessed and licensed by either the CNSC or any foreign national regulatory body. The application should describe the notable design differences between the proposed facility and any similar facilities (for example, those currently operating or under construction). The list should include the following information:

- facility name
- location
- description of the facility

Appendix A: Legislative Clauses

The information submitted by an applicant for a licence to decommission a reactor facility is based on the relevant clauses from legislation, including the *Nuclear Safety and Control Act* (NSCA) and the regulations made under the NSCA. Table A.1 lists select relevant sections; however, applicants are responsible for ensuring that all requirements under the NSCA and regulations for the proposed activities are addressed in an application.

Table A.1: Clauses in the NSCA and the regulations made under the NSCA, mapped to the relevant sections of this licence application guide

Legislation	Clause(s)	Section(s) in this document
NSCA	24(4)	Every SCA (sections 3.1 through 3.14) 5, Other matters of regulatory interest
	26(a), (e)	Every SCA (sections 3.1 through 3.14) 5, Other matters of regulatory interest
General Nuclear Safety and Control Regulations (GNSCR)	3(1)(a)	3.1.2, Applicant's name and business address
	3(1)(c)	3.2.5, Nuclear substances 3.9, Environmental protection 3.11, Waste management
	3(1)(d)	3.4, Safety analysis 3.5, Physical design 3.10, Emergency management and fire protection 3.11, Waste management 3.12, Security
	3(1)(e)	3.4, Safety analysis 3.5, Physical design 3.7, Radiation protection 3.9, Environmental protection 3.11, Waste management 3.12, Security 3.14, Packaging and transport
	3(1)(f)	3.7, Radiation protection
	3(1)(g)	3.5, Physical design 3.12, Security 3.13, Safeguards and non-proliferation
	3(1)(h)	3.5, Physical design 3.12, Security 3.13, Safeguards and non-proliferation

Legislation	Clause(s)	Section(s) in this document
	3(1)(i)	3.4, Safety analysis 3.5, Physical design 3.7, Radiation protection 3.9, Environmental protection 3.10, Emergency management and fire protection (all requirements related to fire) 3.11, Waste management 3.12, Security
	3(1)(j)	3.5, Physical design 3.7, Radiation protection 3.11, Waste management
	3(1)(k)	3.1, Management system 3.2, Human performance 3.3, Operating performance
	3(1)(l)	5, Other matters of regulatory interest
	3(1)(m)	5, Other matters of regulatory interest
	3(1.1)(b)	3.9, Environmental protection
	3(2)	3.13, Safeguards and non-proliferation
	10(b)	3.13, Safeguards and non-proliferation
	12(1)(a)	3.1, Management system 3.2, Human performance management 3.7, Radiation protection 3.10, Emergency management and fire protection
	12(1)(b)	3.2, Human performance management 3.7, Radiation protection 3.10, Emergency management and fire protection
	12(1)(c)	3.3, Operating performance 3.4, Safety analysis 3.5, Physical design 3.7, Radiation protection 3.8, Conventional health and safety 3.9, Environmental protection 3.10, Emergency management and fire protection 3.11, Waste management 3.12, Security
	12(1)(d)	3.7, Radiation protection 3.10, Emergency management and fire protection
	12(1)(e)	3.2, Human performance management 3.3, Operating performance 3.7, Radiation protection 3.10, Emergency management and fire protection

Legislation	Clause(s)	Section(s) in this document
	12(1)(f)	3.3, Operating performance 3.4, Safety analysis 3.5, Physical design 3.7, Radiation protection 3.9, Environmental protection 3.10, Emergency management and fire protection
	12(1)(g)	3.10, Emergency management and fire protection 3.12, Security
	12(1)(h)	3.10, Emergency management and fire protection 3.12, Security
	12(1)(i)	3.13, Safeguards and non-proliferation
	12(1)(j)	3.2, Human performance management 3.12, Security
	15	3.1, Management system
	15(a)	3.1.4, All persons who have authority to interact for the applicant with the CNSC 3.1.9, Legal signing authority
	15(b)	3.1.4, All persons who have authority to interact for the applicant with the CNSC
	17(a)	3.2, Human performance management 3.3, Operating performance 3.7, Radiation protection 3.8, Conventional health and safety 3.9, Environmental protection
	17(b)	3.2, Human performance management 3.3, Operating performance 3.7, Radiation protection 3.8, Conventional health and safety 3.9, Environmental protection
	17(c)	3.1, Management system 3.2, Human performance management 3.3, Operating performance 3.7, Radiation protection 3.8, Conventional health and safety 3.9, Environmental protection 3.12, Security
	17(d)	3.2, Human performance management 3.3, Operating performance 3.7, Radiation protection 3.8, Conventional health and safety

Legislation	Clause(s)	Section(s) in this document
	17(e)	3.1, Management system 3.2, Human performance management Personnel training 3.3, Operating performance 3.7, Radiation protection 3.8, Conventional health and safety 3.9, Environmental protection 3.12, Security
	20(a)	3.14, Packaging and transport
	20(d)	3.13, Safeguards and non-proliferation
	21	3.12, Security
	21(1)(a)	3.13, Safeguards and non-proliferation
	21(1)(b)	3.13, Safeguards and non-proliferation
	22	3.12, Security
	23	3.12, Security
	23(2)	3.13, Safeguards and non-proliferation
	27	[…keep a copy of all info relating to the licence that is submitted by the licensee to the Commission… see section 3] 3.1, Management system
	28	3.1, Management system
	28(1)	3.12, Security
	29	3.3, Operating performance 3.7, Radiation protection 3.12, Security 5.1, Reporting requirements
	29(1)(c)	3.9, Environmental protection
	29(1)d	3.8, Conventional health and safety
	29(1)h	3.8, Conventional health and safety
	29(1)(i)	3.8, Conventional health and safety
	30	3.3, Operating performance 3.12, Security 5.1, Reporting requirements
	31	3.3, Operating performance 5.1, Reporting requirements
	32	3.3, Operating performance 5.1, Reporting requirements
Canadian Nuclear Safety Commission Cost Recovery Fees Regulations	all	5.4, Cost recovery, financial guarantees and insurance 5, Other matters of regulatory interest

Legislation	Clause(s)	Section(s) in this document
Class I Nuclear Facilities Regulations (CINFR)	3(a)	3.2.3, Description of site 3.5, Physical design 3.10, Emergency management and fire protection 3.12, Security
	3(b)	3.2.3, Description of site 3.4, Safety analysis 3.5, Physical design 3.12, Security
	3(c)	3.1.6, Evidence that the applicant is the owner of the site…
	3(d)	3.1, Management system 3.4, Safety analysis 3.5, Physical design
	3(e)	3.2.5, Nuclear and hazardous substances 3.8, Conventional health and safety 3.9, Environmental protection 3.11, Waste management
	3(f)	3.1, Management system 3.2, Human performance management 3.8, Conventional health and safety 3.10, Emergency management and fire protection 3.11, Waste management
	3(g)	3.9, Environmental protection
	3(h)	3.8, Conventional health and safety 3.9, Environmental protection
	3(i)	3.5, Physical design 3.12, Security
	3(j)	5, Other matters of regulatory interest
	3(k)	3.11, Waste management
	5(b)	3.9, Environmental protection
	5(h)	3.12, Security 3.13, Safeguards and non-proliferation
	5(i)	3.9, Environmental protection 3.11, Waste management 3.12, Security 3.14 Packaging and transport
	5(j)	3.9, Environmental protection 3.11, Waste management
	5(k)	3.9, Environmental protection 3.11, Waste management
	7(a)	3.3, Operating performance 3.7, Radiation protection 3.11, Waste management

Legislation	Clause(s)	Section(s) in this document
	7(b)	3.7, Radiation protection 3.9, Environmental protection 3.11, Waste management
	7(c)	3.3, Operating performance 3.7, Radiation protection 3.11, Waste management
	7(d)	3.13, Safeguards and non-proliferation
	7(e)	3.7, Radiation protection 3.9, Environmental protection 3.11, Waste management
	7(f)	3.1, Management system 3.2, Human performance 3.3, Operating performance 3.4, Safety analysis 3.5, Physical design 3.7, Radiation protection 3.8, Conventional health and safety 3.9, Environmental protection 3.10, Emergency management and fire protection 3.11, Waste management 3.12, Security 3.14, Packaging and transport
	7(g)	3.7, Radiation protection 3.9, Environmental protection 3.11, Waste management
	7(h)	3.9, Environmental protection 3.11, Waste management
	7(i)	3.3, Operating performance 3.7, Radiation protection 3.9, Environmental protection 3.10, Emergency management and fire protection
	7(j)	3.2, Human performance 3.5, Physical design 3.7, Radiation protection
	7(k)	3.9, Environmental protection 3.11, Waste management
	9	3.2, Human performance management
	10	3.2, Human performance management
	11	3.2, Human performance management
	12	3.2, Human performance management
	14	3.7, Radiation protection
	14(1)	3.1, Management system 3.9, Environmental protection 3.11, Waste management

Legislation	Clause(s)	Section(s) in this document
	14(2)	3.11, Waste management
	14(3)(d)	3.9, Environmental protection
	14(4)	3.1, Management system
	14(5)	3.1, Management system
Nuclear Non-proliferation Import and Export Control Regulations (NNIECR)	all	3.13, Safeguards and non-proliferation
Nuclear Security Regulations (NSR)	all	3.5, Physical design 3.12, Security
	3(b)	3.2.3, Description of site
	5(a) to (h)	3.14, Packaging and transport
	16	3.2.3, Description of site
	34	3.2 Human performance management
	37(1), (2) and (3)	3.1, Management system
	38	3.1, Management system 3.2, Human performance management
Nuclear Substances and Radiation Devices Regulations (NSRDR)	5	3.7, Radiation protection
	8	3.7, Radiation protection
	17	3.7, Radiation protection
	20	3.7, Radiation protection
	23	3.7, Radiation protection
	36(1)(a)	3.1, Management system 3.12, Security
	36(1)(b)	3.1, Management system
	36(1)(c)	3.1, Management system
	36(1)(d)	3.1, Management system 3.12, Security
	36(1)(e)	3.1, Management system
Packaging and Transport of Nuclear Substances Regulations, 2015 (PTNSR)	all	3.14, Packaging and transport
Radiation Protection Regulations (RPR)	all	3.3, Operating performance 3.4, Safety analysis (all requirements related to dose) 3.5, Physical design 3.7, Radiation protection 3.9, Environmental protection 3.11, Waste management

Appendix B: Safety and Control Areas

The CNSC's regulatory requirements and expectations for the safety performance of programs are grouped into three functional areas and 14 safety and control areas (SCAs). The SCAs are further divided into specific areas that define the key components of each SCA. Table B.1 shows a list of the functional areas, SCAs, and the specific areas that define the key components of each SCA.

Table B.1: The CNSC's functional areas, safety and control areas, and specific areas

Functional area	Safety and control area	Specific area
Management	1. Management system	Management system
		Organization
		Performance assessment, improvements and management review
		Operating experience (OPEX)
		Change management
		Safety culture
		Configuration management
		Records management
		Management of contractors
		Business continuity
	2. Human performance management	Human performance program
		Personnel training
		Personnel certification
		Work organization and job design
		Fitness for duty
	3. Operating performance	Conduct of licensed activities
		Procedures
		Reporting and trending
		Outage management performance
		Safe operating envelope
		Severe accident management and recovery
		Accident management and recovery
Facility and equipment	4. Safety analysis	Deterministic safety analysis
		Hazard analysis
		Probabilistic safety assessment
		Criticality safety
		Severe accident analysis
		Management of safety issues (including R&D programs)
	5. Physical design	Design governance
		Site characterization
		Facility design
		Structure design
		System design
		Component design
	6. Fitness for service	Equipment fitness for service / equipment performance

Functional area	Safety and control area	Specific area
		Maintenance
		Structural integrity
		Aging management
		Chemistry control
		Periodic inspection and testing
Core control processes	7. Radiation protection	Application of ALARA
		Worker dose control
		Radiation protection program performance
		Radiological hazard control
	8. Conventional health and safety	Performance
		Practices
		Awareness
	9. Environmental protection	Effluent and emissions control (releases)
		Environmental management system (EMS)
		Protection of people
		Assessment and monitoring
		Environmental risk assessment
	10. Emergency management and fire protection	Conventional emergency preparedness and response
		Nuclear emergency preparedness and response
		Fire emergency preparedness and response
	11. Waste management	Waste characterization
		Waste minimization
		Waste management practices
		Decommissioning plans
	12. Security	Facilities and equipment
		Response arrangements
		Security practices
		Drills and exercises
		Cyber security
	13. Safeguards and non-proliferation	Nuclear material accountancy and control
		Access and assistance to the IAEA
		Operational and design information
		Safeguards equipment, containment and surveillance
		Import and export
	14. Packaging and transport	Package design and maintenance
		Packaging and transport
		Registration for use

Appendix C: Sample Format for Listing the Supporting Documentation

The applicant should ensure that the licence application addresses all the information requested in this licence application guide. The applicant is encouraged to map the information provided to the related sections and subsections of this document.

Note: The applicant may have already provided supporting documentation in an earlier licence application.

For this supporting documentation and information, the application should clearly identify the information that has already been submitted and provide a list of the supporting documents.

C.1 Sample (suggested) format

This table provides a sample format that the applicant may consider for providing a mapping of the supporting information to the SCA framework. It also provides a sample format for cross-referencing applicable information that has been previously provided to the CNSC.

Note: The column heading "In LCH for WN (Y/N)" indicates whether the document is identified in the licensee's current licence conditions handbook (LCH) as a document requiring written notification (WN) of change to the CNSC.

Document		**Version**	**In LCH for WN (Y/N)**	**Previously submitted (Y/N)**	**Related sections and subsections of REGDOC-1.1.4**
Identifier	**Title**				
					e.g., 4.1

Appendix D: Sample Format for Listing Revisions to the Supporting Documentation

If a document version in the supporting information has changed since the previous submission, the applicant must provide the CNSC with the new version number, a copy of the new version, and a summary of major changes between the new version and the version that was reviewed by CNSC staff.

D.1 Sample (suggested) format

This table provides a sample format that the applicant may consider for providing a list of the supporting documents that have changed since the previous submission.

Note: The column heading "In LCH for WN (Y/N)" indicates whether the document is identified in the licensee's current licence conditions handbook (LCH) as a document requiring written notification (WN) of change to the CNSC.

Document		**Original version number**	**In LCH for WN (Y/N)**	**Current version number**	**Summary of changes (use as many lines as necessary)**
Identifier	**Title**				

Glossary

For definitions of terms used in this document, see REGDOC-3.6, *Glossary of CNSC Terminology*, which includes terms and definitions used in the *Nuclear Safety and Control Act* and the regulations made under it, and in CNSC regulatory documents and other publications. REGDOC-3.6 is provided for reference and information.

References

The CNSC may include references to information on best practices and standards such as those published by CSA Group. With permission of the publisher, CSA Group, all nuclear-related CSA standards may be viewed at no cost through the CNSC web page "How to gain free access to all nuclear-related CSA standards".

1. CNSC, REGDOC-2.11.2, *Decommissioning*, Ottawa, Canada, 2021
2. CNSC, REGDOC-3.5.3, *Regulatory Fundamentals*, Ottawa, Canada, 2018
3. CNSC, REGDOC-3.6, *Glossary of CNSC Terminology*, Ottawa, Canada, 2023
4. CNSC, REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant*, Ottawa, Canada, 2022
5. CNSC, REGDOC-2.11.1, *Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste*, Ottawa, Canada, 2021
6. CNSC, REGDOC-3.5.1, *Licensing Process for Class I Nuclear Facilities and Uranium Mines and Mills*, Ottawa, Canada, 2022
7. CSA Group, CSA N286, *Management system requirements for nuclear facilities*, reaffirmed 2017
8. CNSC, REGDOC-2.1.1, *Management System*, Ottawa, Canada, 2019
9. CSA Group, CSA N286.10, *Configuration management for high energy reactor facilities*, 2016
10. CNSC, REGDOC-2.1.2, *Safety Culture*, Ottawa, Canada, 2018
11. CNSC, REGDOC-2.2.2, *Personnel Training*, Ottawa, Canada, 2016
12. CNSC, REGDOC-2.2.5, *Minimum Staff Complement*, Ottawa, Canada, 2019
13. CNSC, REGDOC-2.2.3, *Personnel Certification, Volume III: Certification of Reactor Facility Workers*, Ottawa, Canada, 2023
14. CNSC, REGDOC-2.2.4, *Fitness for Duty: Managing Worker Fatigue*, Ottawa, Canada, 2017
15. CNSC, REGDOC-2.2.4, *Fitness for Duty, Volume II: Managing Alcohol and Drug Use*, Ottawa, Canada, 2021
16. CNSC, REGDOC-2.2.4, *Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical and Psychological Fitness*, Ottawa, Canada, 2018
17. CSA Group, CSA N294, *Decommissioning of facilities containing nuclear substances*, 2019
18. CNSC, REGDOC-2.12.1, *High-Security Facilities, Volume I: Nuclear Response Force* (prescribed), Ottawa, Canada, 2018
19. CNSC, REGDOC-2.6.2, *Maintenance Programs for Nuclear Power Plants*, Ottawa, Canada, 2017
20. CNSC, REGDOC-2.3.2, *Accident Management*, Ottawa, Canada, 2015
21. CNSC, REGDOC-2.4.4, *Safety Analysis for Class IB Nuclear Facilities*, Ottawa, Canada, 2022
22. CNSC, REGDOC-2.4.1, *Deterministic Safety Analysis*, Ottawa, Canada, 2014

23. CNSC, REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*, Ottawa, Canada, 2022

24. CNSC, REGDOC-2.5.2, *Design of Reactor Facilities*, Ottawa, Canada, 2023

25. CNSC, REGDOC-2.5.1, *General Design Considerations: Human Factors*, Ottawa, Canada, 2019

26. CSA Group, CSA N290.12, *Human factors in design for nuclear power plants*, 2014

27. CSA Group, CSA N293, *Fire protection for nuclear power plants*, 2022

28. CNSC, REGDOC-2.6.1, *Reliability Programs for Nuclear Power Plants*, Ottawa, Canada, 2017

29. CNSC, REGDOC-2.6.3, *Aging Management*, Ottawa, Canada, 2014

30. CNSC, REGDOC-2.7.1, *Radiation Protection*, Ottawa, Canada, 2021

31. CNSC, REGDOC-2.7.2, *Dosimetry, Volume I: Ascertaining Occupational Dose*, Ottawa, Canada, 2021

32. CNSC, REGDOC-2.8.1, *Conventional Health and Safety*, Ottawa, Canada, 2019

33. CSA Group, CSA N288.4, *Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills*, 2019

34. CSA Group, CSA N288.5, *Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills*, 2022

35. CSA Group, CSA N288.6, *Environmental Risk Assessments at Class I Nuclear Facilities and Uranium Mines and Mills*, 2022

36. CSA Group, CSA N288.9, *Guideline for Design of Fish Impingement and Entrainment Programs at Nuclear Facilities*, 2018

37. CNSC, REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures*, Ottawa, Canada, 2020

38. CNSC, REGDOC-2.9.2, *Environmental Protection: Controlling Releases to the Environment*, 2024

39. CSA Group, CSA N288.6, *Environmental risk assessments at class I nuclear facilities and uranium mines and mills*, 2017

40. CNSC, REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*, Ottawa, Canada, 2016

41. CNSC, REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*, Ottawa, Canada, 2021

42. CNSC, REGDOC-2.11, *Framework for Radioactive Waste Management and Decommissioning in Canada*, Ottawa, Canada, 2021

43. CSA Group, CSA N292.0, *General principles for the management of radioactive waste and irradiated fuel*, 2019

44. CSA Group, CSA N292.3, *Management of low- and intermediate-level radioactive waste*, 2014

45. CSA Group, CSA N292.4, *Storage of radioactive waste and irradiated fuel*, 2023

46. CSA Group, CSA N292.5, *Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances*, 2021

47. CSA Group, CSA N292.6, *Long-term management of radioactive waste and irradiated fuel*, 2018

48. CSA Group, CSA N292.8, *Characterization of radioactive waste and irradiated fuel*, 2021

49. CNSC, REGDOC-2.12.1, *High-Security Sites, Volume II: Criteria for Nuclear Security Systems and Devices* (prescribed), Ottawa, Canada, 2018

50. CNSC, REGDOC-2.12.2, *Site Access Security Clearance*, Ottawa, Canada, 2013

51. CNSC, REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material*, Ottawa, Canada, 2020

52. CSA Group, CSA N290.7, *Cyber security for nuclear facilities*, 2021

53. IAEA, *Security During the Lifetime of a Nuclear Facility*, IAEA Nuclear Security Series No. 35-G, IAEA, Vienna, 2019

54. IAEA, *Computer Security Techniques for Nuclear Facilities*, IAEA Nuclear Security Series No. 17-T, IAEA, Vienna, 2021

55. IAEA, *Computer Security of Instrumentation and Control Systems at Nuclear Facilities*, IAEA Nuclear Security Series No. 33-T, IAEA, Vienna, 2018

56. International Atomic Energy Agency (IAEA), *Treaty on the Non-Proliferation of Nuclear Weapons* (INFCIRC/140), Vienna, Austria, 1968

57. IAEA, *Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (INFCIRC/164), 1972

58. IAEA, *Protocol Additional to the Agreement Between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (INFCIRC/164/Add 1), 2000

59. CNSC, REGDOC-2.13.2, *Import and Export*, Ottawa, Canada, 2018

60. CNSC, REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy*, Ottawa, Canada, 2018

61. CNSC, REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*, Ottawa, Canada, 2024

62. CNSC, REGDOC-3.1.2, *Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills*, Ottawa, Canada, 2022

63. CNSC, REGDOC-3.2.1, *Public Information and Disclosure*, Ottawa, Canada, 2018

64. CNSC, REGDOC-3.2.2, *Indigenous Engagement*, Ottawa, Canada, 2022

65. CNSC, REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*, Ottawa, Canada, 2021

66. Treasury Board of Canada Secretariat *Policy on Government Security*, 2009, revised 2019

CNSC Regulatory Document Series

Facilities and activities within the nuclear sector in Canada are regulated by the CNSC. In addition to the *Nuclear Safety and Control Act* and associated regulations, these facilities and activities may also be required to comply with other regulatory instruments such as regulatory documents or standards.

CNSC regulatory documents are classified under the following categories and series:

1.0 Regulated facilities and activities

Series
- 1.1 Reactor facilities
- 1.2 Class IB facilities
- 1.3 Uranium mines and mills
- 1.4 Class II facilities
- 1.5 Certification of prescribed equipment
- 1.6 Nuclear substances and radiation devices

2.0 Safety and control areas

Series
- 2.1 Management system
- 2.2 Human performance management
- 2.3 Operating performance
- 2.4 Safety analysis
- 2.5 Physical design
- 2.6 Fitness for service
- 2.7 Radiation protection
- 2.8 Conventional health and safety
- 2.9 Environmental protection
- 2.10 Emergency management and fire protection
- 2.11 Waste management
- 2.12 Security
- 2.13 Safeguards and non-proliferation
- 2.14 Packaging and transport

3.0 Other regulatory areas

Series
- 3.1 Reporting requirements
- 3.2 Public and Indigenous engagement
- 3.3 Financial guarantees
- 3.4 Commission proceedings
- 3.5 CNSC processes and practices
- 3.6 Glossary of CNSC terminology

Note: The regulatory document series may be adjusted periodically by the CNSC. Each regulatory document series listed above may contain multiple regulatory documents. Visit the CNSC's website for the latest list of regulatory documents.