

Environmental Protection:

Environmental Protection Policies, Programs and Procedures

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Preface

This regulatory document is part of the CNSC's Environmental Protection series of regulatory documents. The full list of regulatory document series is included in the back of this document and can be found on the CNSC's Web site at nuclearsafety.gc.ca/regulatorydocuments

This regulatory document sets out the requirements and guidance of the Canadian Nuclear Safety Commission (CNSC) with respect to the environmental protection policies, programs and procedures.

This document is the second version of *Environmental Protection Policies*, *Programs and Procedures*. This version, issued as REGDOC-2.9.1, combines the information from and supersedes two other documents: S-296, *Environmental Protection Policies*, *Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills*, and G-296, *Developing Environmental Protection Policies*, *Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills*. This document amends the guidance to reflect lessons learned from the Fukushima Daiichi nuclear event of March 2011, and address findings from the *CNSC Fukushima Task Force Report*.

This document is intended to form part of the licensing basis for a regulated facility or activity. It is intended for inclusion in licences as either part of the conditions and safety and control measures in a licence, or as part of the safety and control measures to be described in a licence application and the documents needed to support that application.

Important note: Where referenced in a licence either directly or indirectly (such as through licensee-referenced documents), this document is part of the licensing basis for a regulated facility or activity.

The licensing basis sets the boundary conditions for acceptable performance at a regulated facility or activity and establishes the basis for the CNSC's compliance program for that regulated facility or activity.

Where this document is part of the licensing basis, the word "shall" is used to express a requirement, 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 advised or 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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Environmental Protection: Policies, Programs and Procedures

1. Introduction

1.1 Purpose

The purpose of this regulatory document, when incorporated in a licence or other legally enforceable instrument, is to help assure that licensees implement adequate environmental protection policies, programs and procedures, other than for licences to abandon, at Class I nuclear facilities and uranium mines and mills, in accordance with the *Nuclear Safety and Control Act* (NSCA) and regulations.

1.2 Scope

This document sets out the environmental protection policies, programs and procedures that licensees shall implement at Class I nuclear facilities and uranium mines and mills, when required by the applicable licence or other legally enforceable instrument.

1.3 Relevant regulations

The following provisions of the NSCA and regulations are relevant to this standard:

- Subsection 24(4) of the NSCA prohibits the Commission from issuing, renewing, amending or replacing a licence, unless in the opinion of the Commission, the applicant is
 - a. qualified to carry on the activity that the licence will authorize the licensee to carry on, and
 - will, in carrying out that activity, 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;
- Subsection 24(5) of the NSCA provides that a licence issued by the Canadian Nuclear Safety Commission (CNSC) may contain any term or condition that the Commission considers necessary for the purposes of the Act;
- Paragraph 3(g) of the *Class I Nuclear Facilities Regulations* stipulates that an application for a CNSC licence, other than a licence to abandon, shall contain, in addition to other information, "the proposed environmental protection policies and procedures;" and
- Paragraph 3(c)(v) of the *Uranium Mines and Mills Regulations* stipulates that an application for a licence in respect of a uranium mine or mill, other than a licence to abandon, shall contain, in addition to other information, "the proposed environmental protection policies and programs."

Other acts and regulations also apply to projects, to support environmental protection policies, programs and procedures (refer to the References section for details).

2. Environmental Protection Policies, Programs, and Procedures

2.1 Objective

The objective of the environmental protection policies, programs and procedures is to establish adequate provision for protection of the environment at Class I nuclear facilities and uranium mines and mills. This shall be accomplished through an integrated set of documented activities that are typical of an environmental management system (EMS)

2.2 Environmental management system requirements

The licensee shall perform the following tasks:

- Establish, implement and maintain an EMS that meets the requirements set by CAN/CSA ISO 14001:2004, *Environmental Management Systems—Requirements with Guidance for Use*.
- Ensure that the scope of the EMS is consistent with the definitions of "environment," "environmental effect" and "pollution prevention" provided in the Glossary.
- Conduct internal audits (clause 4.5.5 of CAN/CSA ISO 14001:2004) at planned intervals so that all elements of the EMS are audited on at least a five-year cycle.
- Conduct a management review (clause 4.6 of CAN/CSA ISO 14001:2004) annually.

Notes:

- 1. Certification to CAN/CSA ISO 14001 by an authorized registrar, or other independent third party, is not considered by the CNSC as meeting the requirements of this document. The CNSC, in exercising its responsibilities as outlined in the NSCA, will evaluate all licensees' programs in relation to the requirements of this standard.
- 2. As a federal agency, the CNSC has adopted certain key concepts in environmental protection from other federal statutes that are not defined in the NSCA and regulations. To prevent misinterpretation of these concepts, which relate to similar concepts in CAN/CSA ISO 14001:2004, expanded definitions are provided for the terms "environment," "environmental effect" (impact) and "pollution prevention" (prevention of pollution) in the Glossary.

3. Guidance on Environmental Protection Policies, Programs, and Procedures

3.1 Introduction

Environmental protection policies, programs, and procedures are an important component of the overall requirement for licensees to make adequate provision for protection of the environment. Licensees also have specific obligations to take all reasonable precautions to protect the environment and to control the releases of nuclear and hazardous substances. The respective regulations require submission of environmental protection policies and procedures at Class I nuclear facilities and submission of environmental protection policies and programs at uranium mines and mills. The choice of words relates to the level of detail expected in documentation for the different facilities. For uranium mines and mills, higher-level program documents are submitted with reference to lower-level procedures.

Policies, programs and procedures together form an integrated set of documented activities, usually referred to as an environmental management system (EMS). An EMS provides a framework for action with respect to environmental protection. This includes the overall management of the prevention of unreasonable risk to the environment through integrated

activities. Such activities include the management of releases, wastes, training and public information. As a whole, an EMS addresses effective control measures on releases and wastes to prevent or mitigate environmental effects in the context of pollution prevention. The demonstration of the effectiveness of controls through effluent and environmental monitoring activities is a major element of an EMS.

The EMS may consist of one or several documents. The EMS may incorporate pertinent information directly or by reference. For large facilities, complex facilities, or both with a high level of environmental risk, documentation may be in the form of an EMS manual. Information may also be incorporated in similar documents (e.g., in an integrated quality management system manual). For all facilities, sufficient detail should be provided to demonstrate that releases, wastes and potential environmental effects have been identified and will be monitored and managed in a proactive and preventive fashion.

In determining the scope of documentation to be submitted, the applicant may consult with CNSC staff for specific guidance.

3.2 Environmental management system scope

For all facilities, the complexity of EMS documentation should be commensurate with the nature and scale of the environmental effects that may result from licensed activities. CAN/CSA ISO 14001, with a few additional CNSC-specific requirements, is the basis for this CNSC regulatory document. This document may be incorporated in a licence as a legal requirement. For all licences, the information provided in this document, as well as in CAN/CSA ISO 14001 and CAN/CSA ISO 14004, *Environmental Management Systems - General Guidelines on Principles, Systems and Support Techniques*, should be used to develop an EMS that will meet CNSC requirement for policies, programs or procedures in environmental protection.

Use of ISO guidance for the design of an EMS is acceptable in both cases, as long as differences between key concepts in federal legislation and those in CAN/CSA ISO 14001 are considered in the scope. In the NSCA and the *Canadian Environmental Protection Act* (CEPA), risk is a key concept in environmental protection. CAN/CSA ISO 14001 does not use the term risk in the context of an EMS. Rather, CAN/CSA ISO 14001 addresses significant environmental aspects and impacts. It also provides only minimal guidance on the interpretation of adverse environmental effects. Definitions of the environment and pollution prevention are also much narrower. Expanded definitions from federal legislation of the "environment," "environmental effect" (impact) and "pollution prevention" (prevention of pollution) are therefore provided in the Glossary to avoid misinterpretation. Implications to the scope of the EMS are elaborated below.

Pollution prevention has a specific meaning in federal legislation; this meaning has implications for how an EMS addresses environmental impacts. The expanded definition in federal legislation is fundamentally more demanding than the corresponding ISO definition. It specifies "avoiding or minimizing" pollution relative to "overall risk," whereas the ISO definition includes "avoids, reduces or controls" pollution relative to "adverse environmental impacts." Hence, it is the CNSC's expectation that the concept of minimizing releases be included in the scope of the EMS, along with a broader interpretation of impacts.

Pollution prevention is the key principle underlying the management of hazardous substances in Canada. Section 64 of the CEPA defines the nature of toxic substances, explicitly defining unreasonable risk for certain scheduled substances. For other potentially hazardous substances that are not subject to legislation, unreasonable risk may be interpreted in terms of likely

significant adverse effects. This concept is nearly equivalent to the CAN/CSA ISO 14001 concept of significant environmental impacts. Guidance documents that support assessments required under the *Canadian Environmental Assessment Act* (CEAA) elaborate in detail on how environmental effects or impacts are typically interpreted. In the CNSC licensing process for Class I facilities and uranium mines and mills, the CEAA process provides an initial framework for identification and assessment of the equivalent of ISO significant environmental aspects in an appropriate context. This information can provide the initial foundation for the scope of the EMS.

For nuclear substances, the *Radiation Protection Regulations* require that exposure and dose to persons be managed according to the principle of ALARA (as low as reasonably achievable), while taking into account social and economic factors. G-129, *Keeping Radiation Exposures and Doses "As Low As Reasonably Achievable (ALARA)"*, expands on how to manage exposure and doses using the ALARA principle. The *Radiation Protection Regulations* further define unreasonable risk explicitly for workers and the public through prescribed dose limits, and require these risks to be monitored by direct measurement or by estimation of the quantities and concentrations of any nuclear substance released as a result of the licensed activity.

For non-human biota, assessment of risks from nuclear substances is an evolving issue. Guidance on methodology should be taken from recognized, authoritative sources (e.g., the framework published by the International Commission on Radiological Protection). CNSC staff assessment of programs to manage these risks complements their assessment of programs to manage risks from hazardous substances. This approach is consistent with approaches adopted by provincial and federal agencies (e.g., Ontario Ministry of the Environment, Environment Canada, Canadian Council of Ministers of the Environment).

3.3 Environmental management system framework

A licence application requires the description of the effects of licensed activities on the environment. Typically, an environmental assessment will meet this major requirement (e.g., conducted for the purposes of the CEAA and updated as appropriate). The assessment may be used to refine practical details in the EMS for managing releases and wastes in order to prevent unreasonable risk to the environment. As appropriate for the facility type and phase of licensing, the EMS should include the proposed measures to control releases of nuclear substances, hazardous substances, or both into the environment, and the measures that will be taken to prevent or mitigate the effect.

3.3.1 Releases

In terms of releases, the EMS should be commensurate with the overall regulatory requirements, and the specific information provided on the proposed location of points of release, the proposed maximum quantities and concentrations, and the anticipated volume and flow rate of releases of nuclear substances and hazardous substances into the environment, including their physical, chemical and radiological characteristics.

3.3.2 Wastes

In terms of wastes, the EMS should be commensurate with the overall regulatory requirements and the specific information provided on the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed. This includes waste that may be stored, managed, processed or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste. For uranium

mines and mills, there is a further requirement to address management of the anticipated liquid and solid waste streams within the mine or mill, including:

- the ingress of fresh water and any diversion or control of uncontaminated surface and ground water
- the anticipated quantities, composition and characteristics of backfill
- the proposed waste management system

3.3.3 Other considerations

As a further consideration, the EMS should address environmental emergency preparedness and response in terms of:

- the proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment
- the proposed measures to ensure the availability and accessibility of environmental monitoring instrumentation during emergencies
- the inclusion of environmental monitoring instrumentation and equipment layouts in emergency plans
- the health and safety of persons

In addition, reporting requirements for certain potential or real emergency situations should be included in the EMS. Lastly, additional elements relating to worker training or qualifications, and the environmental protection obligations of workers should be included. Training programs should enable workers to meet their obligations with respect to environmental protection.

Generic guidance on environmental assessment, historical operating information, and experience from similar facilities may be used to justify the degree of management proposed in all areas of environmental protection. All pertinent information may be used for scoping the management of controls on releases and wastes, and for determining the appropriate balance between effluent and environmental monitoring.

3.4 EMS elements

The detailed structure of the EMS may be taken from the information provided in CAN/CSA ISO 14001 and CAN/CSA ISO 14004. Additional guidance concerning CAN/CSA ISO 14001 clause 4.5.1 "Monitoring and Measurement" is provided below to illustrate the correspondence between performance elements in CAN/CSA ISO 14001 and certain CNSC regulations and CNSC guidance documents.

3.4.1 Monitoring and measuring

Procedures should be established to measure, monitor and evaluate environmental performance relative to performance indicators and targets that are linked to environmental objectives. On the whole, measurement and evaluation should be key to the verification of the efficacy of controls on contaminants in terms of pollution prevention. The overall process should include both periodic and continual feedback mechanisms to assess and implement actions in order to achieve performance targets. Monitoring should be conducted on a spatial and temporal scale relevant to environmental effects predicted in an environmental assessment.

Performance indicators are objective, verifiable and reproducible measures of operational performance with a foundation in predictions arising from an environmental assessment. Effluent monitoring should be the primary indicator of performance in terms of releases to air, surface waters, groundwater and soils from both facility operations and waste management activities.

Effluent monitoring addresses both the nature and quantities of releases of nuclear and hazardous substances (including wastes). Monitoring schedules should be linked to administrative controls to prevent the development of situations that can lead to unreasonable risk to the environment. Targets should be designed to prompt investigation of abnormal situations, and if necessary, result in preventive measures. Measurement and evaluation should also be coordinated to permit timely corrective action.

As appropriate for the level of environmental risk, environmental monitoring should be conducted and integrated with effluent monitoring. Environmental monitoring should provide confidence that mitigation measures are effective, health and environmental effects remain acceptably low, and contaminants in the environment do not exceed levels anticipated at licensing.

As part of a *Code of Practice for Uranium Mines and Mills* certain prescribed performance targets (action levels) must be developed for environmental protection purposes. These and other operational limits should address the management of releases at source in terms of the administrative measures being taken to control releases. All facilities require action levels for the radiation protection program. Although specific to radiation protection, G-218, *Preparing Codes of Practice to Control Radiation Doses at Uranium Mines and Mills* and G-228, *Developing and Using Action Levels* provide useful generic guidance on the principles underlying action levels. These principles, along with ALARA as outlined in G-129, *Keeping Radiation Exposures and Doses "As Low As Reasonably Achievable (ALARA)* should be used to develop targets for environmental performance.

For Class I nuclear facilities, a code of practice for environmental protection purposes is not required. However, licensees should implement operational targets at source on releases of potential concern under the requirement to control releases, The development of administrative controls typically requires modelling of environmental pathways to derive release targets that can be interpreted in terms of levels in environmental media. These levels are chosen to protect the environment as a whole, with adequate safety margins. The *Canadian Environmental Quality Guidelines* provide practical guidance on levels that are thought to be sufficiently protective. Alternatively, levels can be derived from assessments performed under the CEAA, the CEPA, or the NSCA.

Facilities with potential for public exposure are also expected to develop derived release limits (DRLs). Historically, DRLs were referred to as derived emission limits. Facilities calculate DRLs through multimedia pathways modelling; DRLs represent estimates of releases that could result in doses to the public equal to the prescribed public limit for effective dose of 1 mSv per year or associated equivalent dose limits. If not referenced in the EMS as part of licensing documentation, DRLs may be incorporated separately in a licence condition.

Abbreviations

ALARA as low as reasonably achievable

CEAA Canadian Environmental Assessment Act

CEPA Canadian Environmental Protection Act

CNSC Canadian Nuclear Safety Commission

CSA Group (formerly Canadian Standards Association)

DRL derived release limit

EMS Environmental management system

ISO International Organization for Standardization

NSCA Nuclear Safety and Control Act

Glossary

environment

Expanding on clause 3.5 of CAN/CSA ISO 14001:2004, *Environmental Management Systems – Requirements with Guidance for Use*, the environment refers to the components of the earth, including:

- (a) land, water, and air, including all layers of the atmosphere
- (b) all organic and inorganic matter and living organisms
- (c) the interacting natural systems that include components referred to in (a) and (b)

environmental effect

Expanding on "environmental impact" from clause 3.7 of CAN/CSA ISO 14001:2004, *Environmental Management Systems – Requirements with Guidance for Use*, environmental effect includes:

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

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

- health and socio-economic conditions;
- physical and cultural heritage;
- the current use of lands and resources for traditional purposes by aboriginal persons; or
- any structure, site, or thing that is of historical, archeological, paleontological, or architectural significance; or

whether any such change or effect occurs within or outside Canada (adapted from *Uranium Mines and Mills Regulations*).

licensed activity

An activity described in any of paragraphs 26(a) to (f) of the *Nuclear Safety and Control Act* that a licence authorizes the licensee to carry on.

licensee

A person who is licensed to carry on an activity described in any of paragraphs 26(a) to (f) of the *Nuclear Safety and Control Act*.

licensing basis

A set of requirements and documents for a regulated facility or activity comprising:

- the regulatory requirements set out in the applicable laws and regulations
- the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence
- the safety and control measures described in the licence application and the documents needed to support that licence application

performance indicator

A quantifiable variable related to the actions of a proposed or licensed activity that may cause or indicate an adverse environmental effect if a certain threshold value is reached.

performance target

A limit on a performance indicator designed to prevent unreasonable risks to the environment. More than one limit may be set or considered for a performance indicator.

pollution prevention

Expanding on "prevention of pollution" from clause 3.18 of CAN/CSA ISO 14001:2004, *Environmental Management Systems – Requirements with Guidance for Use*, pollution prevention means the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce overall risk to the environment or human health

References

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CNSC Regulatory Document Series

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

Effective April 2013, the CNSC's catalogue of existing and planned regulatory documents has been organized under three key categories and twenty-five series, as set out below. Regulatory documents produced by the CNSC fall under one of the following series:

1.0 Regulated facilities and activities

Series	1 1	Reactor facilitie	_
Series	1.1	Reactor facilitie	

- 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 aboriginal engagement
 - 3.3 Financial guarantees
 - 3.4 Commission proceedings
 - 3.5 Information dissemination

Note: The regulatory document series may be adjusted periodically by the CNSC. Each regulatory document series listed above may contain multiple regulatory documents. For the latest list of regulatory documents, visit the CNSC's Web site at nuclearsafety.gc.ca/regulatory-documents