Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Canada

REGDOC-2.9.2, ENVIRONMENTAL PROTECTION: Controlling Releases to the Environment

Commission Meeting September 15, 2022

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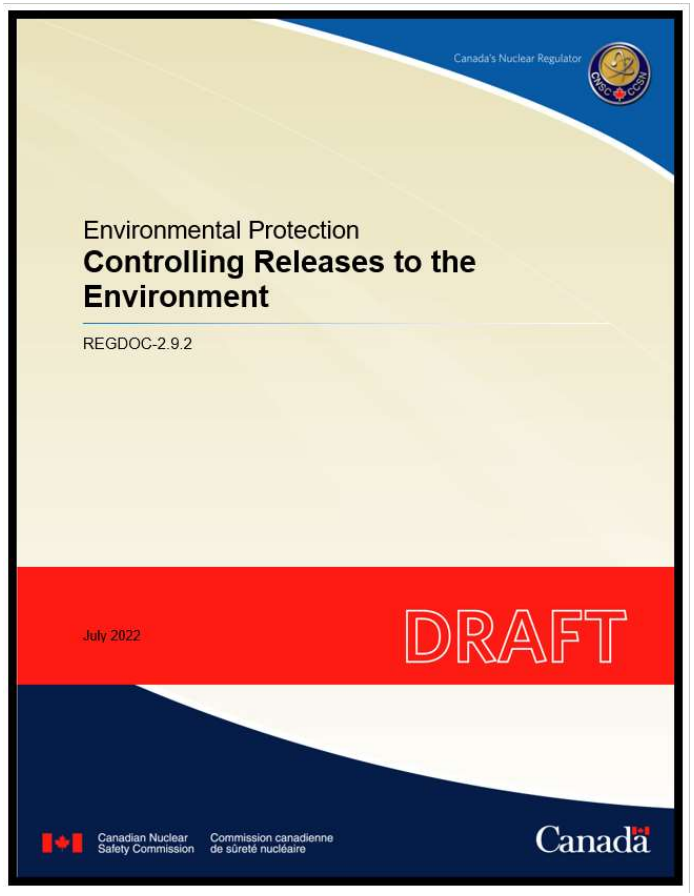
CMD 22-M27.A

PURPOSE

Request for approval of:

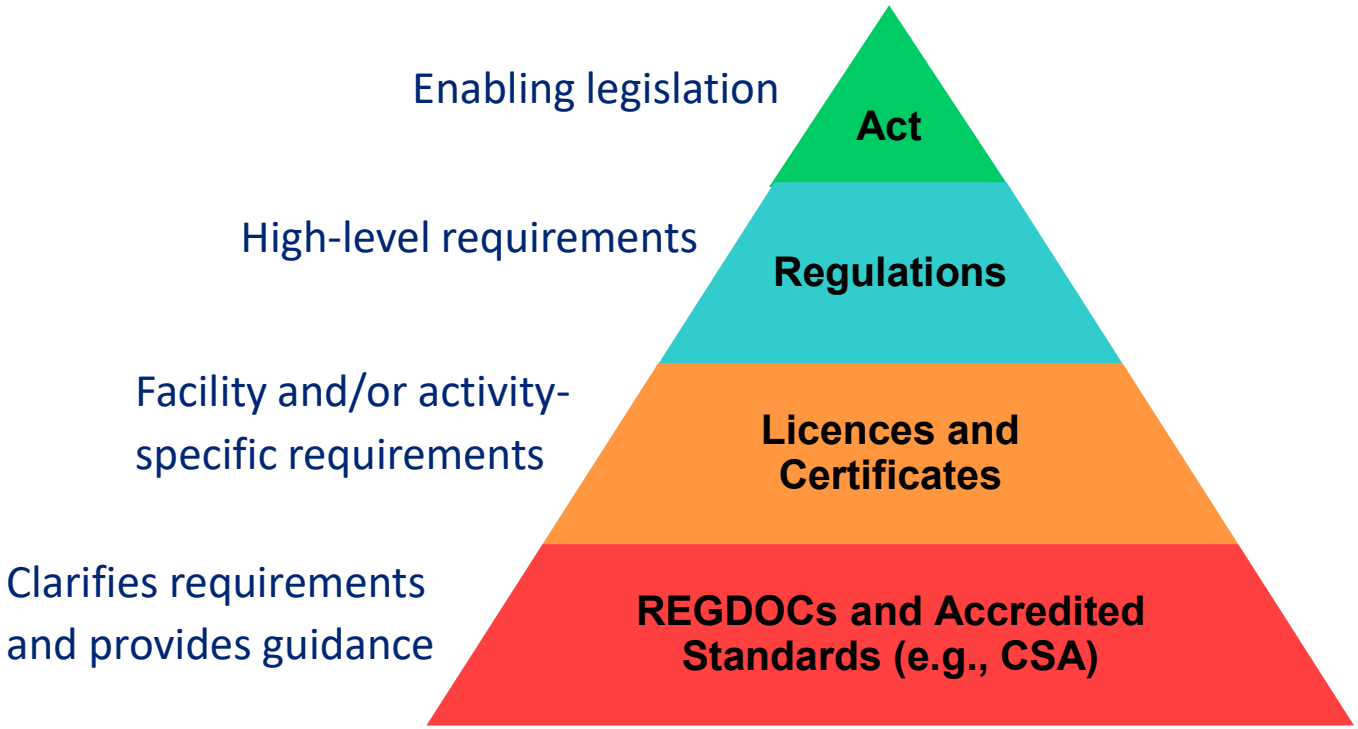
REGDOC-2.9.2, *Environmental Protection: Controlling Releases to the Environment,* Version 1



OUTLINE

- Regulatory framework for protection of the environment
- Scope, purpose and summary of REGDOC
- REGDOC development process
- Open consultation and themes raised
- Implementation
- Conclusion and recommendation

THE CNSC'S REGULATORY FRAMEWORK



All parts of the regulatory framework work together to articulate objectives to be met to prevent unreasonable risk to the environment, health and safety of persons and national security.

REGULATORY REQUIREMENTS

FOR CONTROLLING RELEASES TO THE ENVIRONMENT

- *General Nuclear Safety and Control Regulations*
  - 12 (1) (f) Every licensee shall take **all reasonable precautions to control the release of** radioactive **nuclear substances or hazardous substances** within the site of the licensed activity and into the environment as a result of the licensed activity
- *Class I Nuclear Facilities Regulations*: section (6)
  - (g) proposed commissioning program for systems and equipment that will be used at the nuclear facility
  - (h) the **effects on the environment and the health and safety of persons** that may result from the operation and decommissioning of the nuclear facility, and the **measures that will be taken** to prevent or mitigate those effects
  - (i) 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
  - (j) the **proposed measures to control releases** of nuclear substances and hazardous substances into the environment
- Similar text in *Uranium Mines and Mills Regulations*

OTHER REGULATORY INSTRUMENTS

- *Canadian Environmental Protection Act*, 1999
  - Pollution prevention is priority approach to environmental protection
- *Fisheries Act*
  - 36(3) states, "**no person shall deposit or permit the deposit of a deleterious substance** of any type in water frequented by fish…"
  - 36(4)(c) states, "**No person contravenes subsection (3)** … of which is **authorized by regulations made under subsection (5.2)** and that is deposited in accordance with those regulations"
- *Regulations Establishing Conditions for Making Regulations Under Subsection 36(5.2) of the Fisheries Act* (SOR/2014-91) requires following conditions be met
  - Authorization of releases are subject to enforcement and compliance regime
  - Effluent cannot be acutely lethal
  - Appropriate guidelines for protecting aquatic life are adopted
  - Effects of deposit on fish, fish habitat and use of fish by man are evaluated

REGULATORY DOCUMENT FRAMEWORK

1.0 Regulated Facilities and Activities

- 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

- 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
  - REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures*
  - **REGDOC-2.9.2, *Environmental Protection: Controlling Releases to the Environment***
- 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

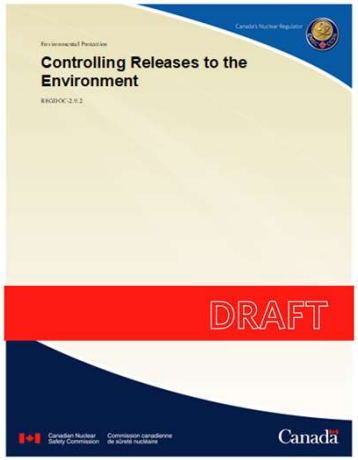
- 3.1 Reporting Requirements
- 3.2 Public & Indigenous Engagement
- 3.3 Financial Guarantees
- 3.4 Commission Proceedings
- 3.5 CNSC processes and practices
- 3.6 Glossary of CNSC terminology

ENVIRONMENTAL PROTECTION REGDOC 2.9 SERIES

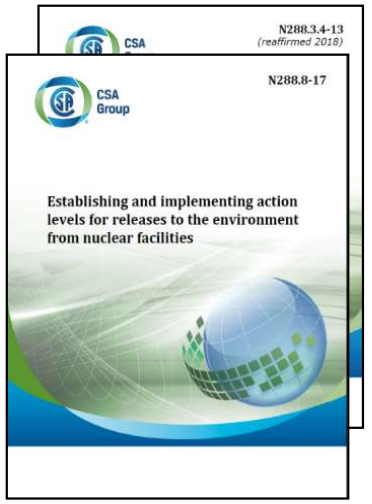
CSA Standards
N288.1, 4, 5, 6, 7

REGDOC 2.9.1

Current



Draft REGDOC 2.9.2



CSA Standard
N288.3.4 & N288.8

Proposed / Current

SCOPE OF REGDOC-2.9.2

- For nuclear facilities or activities that release nuclear or hazardous substances under normal operation
  - Applies to Class I nuclear facilities and uranium mines and mills
  - Applied to other facilities or activities in a graded manner
- Does not address :
  - Accident or emergency conditions
    - Emergency management programs take effect until normal operation is restored
  - Management of spills, fugitive emissions or uncontrolled releases
    - Existing requirements for reporting and taking corrective actions apply

PURPOSE OF THIS REGULATORY DOCUMENT (1/2)

- Standardizes and formalizes existing practices and expectations
- Provides consistent approach for controlling releases to the environment
- Harmonizes requirements with other Canadian jurisdictions
  - Formalizes the framework for setting limits on releases of hazardous substances
- Adopts international standards and best practice for nuclear substance release limits
  - Addresses 2019 International Atomic Energy Agency (IAEA) Integrated Regulatory Review Service (IRRS) recommendation related to authorizing releases

PURPOSE OF THIS REGULATORY DOCUMENT (2/2)

- Documents CNSC processes for regulating releases to the environment which demonstrate respect for Section 36(3) of the *Fisheries Act*
- Specifies requirements and guidance on :
  - Applying concept of best available technology and techniques, economically achievable (BATEA)
  - Establishing and implementing licensed release limits
  - Establishing and implementing environmental action levels
  - Commissioning of new treatment systems and confirming their performance
  - Implementing adaptive management

BATEA ASSESSMENT

- A review of technology/techniques to identify adequate design that considers pollution prevention and risk mitigation to protect human health and environment
- Elements of a BATEA Assessment
  - Characterization of pollutant source(s)
  - Identification of contaminants and physical stressors that require control
  - Establishment of **environmental release targets (ERTs)**
  - Analysis of options for technology and techniques
  - Identification of the **maximum predicted design release** characteristics **(MPDRs)**
  - Analysis of benefits
  - Selection of BATEA option

LICENSED RELEASE LIMITS
AND ENVIRONMENTAL ACTION LEVELS

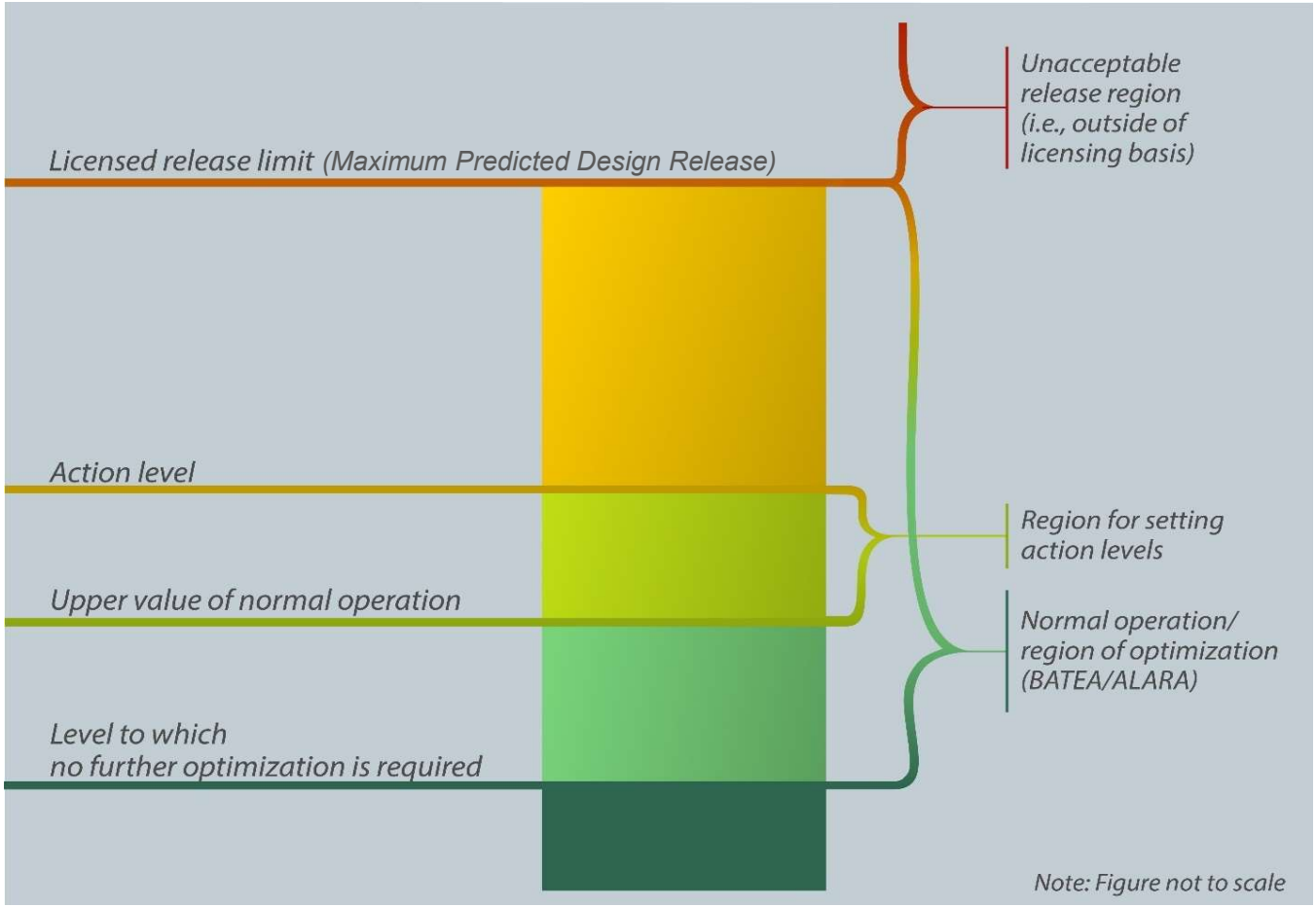
Action level:

An indicator of a potential loss of control in part of a licensee's program(s) or control measure(s). Exceeding an action level signals a potential reduction in effectiveness of the program and/or control measure(s) and may indicate a deviation from normal operation. Exceeding an action level is not a non-compliance, but triggers a requirement for specific action to be taken.

Licensed release limit:

A limit that, if exceeded, represents a loss of control in part of the licensee's program(s) and/or control measure(s). Exceeding a licensed limit indicates that the licensee is operating outside of their approved licensing basis for normal operation, but does not necessarily imply an unreasonable risk to the environment and to the health and safety of persons. Exceeding a licensed limit is a non-compliance, and triggers a requirement for specific action to be taken.

RELATIONSHIPS



Relationships between licensed release limits and environmental action levels

RESPONDING TO AN EXCEEDANCE

- **Action level exceedance**
  - Notify and report to CNSC staff as specified in licence or licence conditions handbook
  - Conduct an investigation to identify basis for the exceedance
  - Where necessary, take action to restore effectiveness of program or control measures
- **Licensed release limit exceedance** = outside of licensing basis
  - Follow reporting requirements described in 3.1 series REGDOCs
  - Limit, to extent possible, effect and magnitude of exceedance
  - Conduct investigation to establish cause and determine magnitude of exceedance
  - Assess the potential effects on human health and environment
  - Identify and take action to restore effectiveness of environmental protection program and/or control measure(s), and prevent recurrence

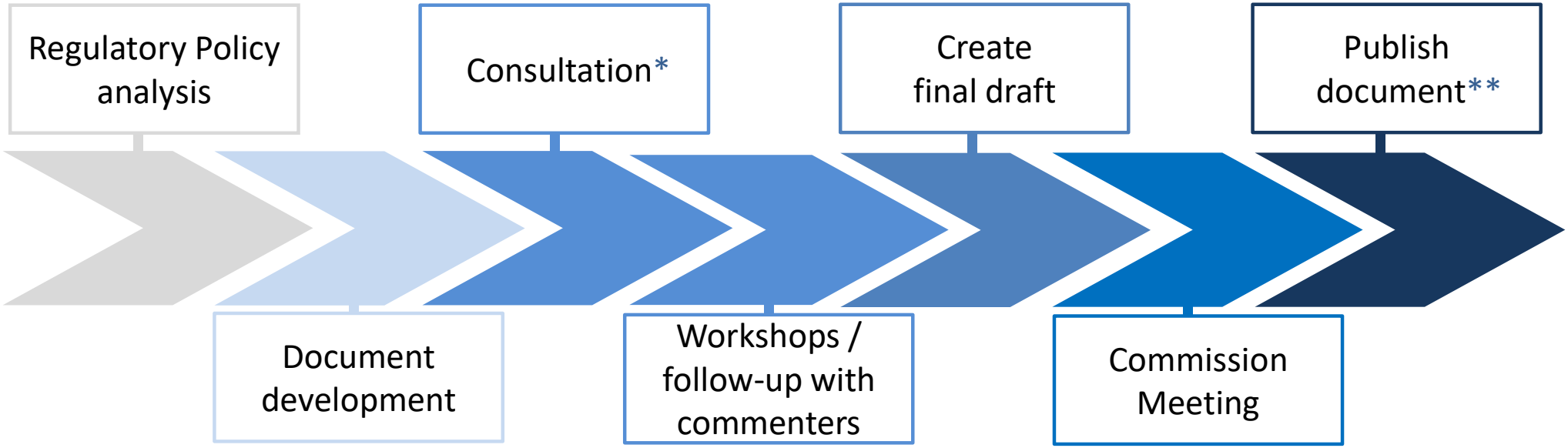
COMMISSIONING OF TREATMENT SYSTEMS

- New treatment systems commissioned to verify:
  - System has been constructed and will operate in accordance with the design basis before commencing releases to the environment
  - System is not exceeding licensed release limits
  - Previously established action levels are appropriate
- Guidance on contents of a commissioning plan and how to confirm performance

ADAPTIVE MANAGEMENT

- The implementation of new/modified mitigation measures over life of project to address unanticipated environmental effects
- May be required as a result of:
  - Changes to the operation or to the licensed activity
  - Changes in scientific understanding of substance's toxicity/physical effect
- Triggered if unreasonable or potential unreasonable risk identified (e.g., through the Environmental Risk Assessment)
  - Develop, document, and implement adaptive management plan to:
    - Reduce releases of identified contaminants and physical stressors
    - Mitigate any potential effects on the environment
  - Provide periodic updates as needed to reflect the current operation

REGDOC DEVELOPMENT PROCESS



REGDOCs are developed through an iterative development process

* Consultation is open (to industry, public and all Indigenous Peoples)
** If approved

HISTORY OF DEVELOPMENT

- Discussion paper DIS-12-02, *Process for Establishing Release Limits and Action Levels at Nuclear Facilities* :
  - Approximately 5 months of consultation
    - Extensive feedback from non-industry groups and one environmental group
  - What We Heard Report (2012)
  - Multi-Stakeholder Workshop with those who commented (2013)
  - Commenced document development (2013)
- Consultation on the topic also contributed to development of :
  - CSA N288.8-17, *Establishing and implementing action levels for releases to the environment from nuclear facilities*
  - REGDOC 2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures*, 2017

CONSULTATION ON REGDOC-2.9.2

CONSULTATION*

49 comments

9 commenters

March – August 2021

Info-sessions in April 2021

WORKSHOP WITH INDUSTRY COMMENTERS

CNSC offer to follow up with non-industry commenter

February 2022

REGDOC-2.9.2

submitted to Commission for approval

September 2022

INDIGENOUS ENGAGEMENT

- Indigenous Nations and communities specifically invited to comment during the open review period and attend webinar info-session
  - No questions or comments received
- Provided awareness and updates on draft REGDOC 2.9.2 development during monthly meetings with many Indigenous Nations and communities
  - A couple of Nations asked for additional information
- A summary of draft REGDOC 2.9.2 was presented during outreach activities on the Environmental Protection Safety and Control Area

REGDOC-2.9.2 CONSULTATION THEMES

- Duplication of Authority
- Action Levels
- Proposed Release Limits Methodology for Nuclear Substances
- Application of Environmental Release Targets

1 CONCERN 1: DUPLICATION OF AUTHORITY

Issue:

- Stakeholders expressed concern regarding duplication of authority with provincial regulators in the area of hazardous substances

CNSC Response:

- The CNSC's mandate encompasses the regulation of releases for nuclear and hazardous substances
- REGDOC is intended to reduce regulatory duplication through harmonization with other jurisdictions
- Additional clarity added throughout the REGDOC on how CNSC licensed release limits will be harmonized with provincial limits

2 CONCERN 2: ACTION LEVELS

Issue:

- Confusion with use of the term "*maximum predicted design release*" and "*upper value of normal operation*"
- Concern regarding revising action levels shortly following initial implementation

CNSC Response:

- New content added to clarify terminology maximum predicted design release and the upper value of normal operation
- CNSC clarified that CSA N288.8, *Establishing and implementing action levels for releases to the environment from nuclear facilities,* provides requirements and guidance to update action levels when there is a change in licensed release limits

3 CONCERN 3: PROPOSED RELEASE LIMITS METHODOLOGY

Issue:

- Concern with lack of clarity in methodology for establishing proposed release limits for nuclear substances
- Concern that changes to current radiological release limits could be incorrectly perceived that current limits were not protective

CNSC Response:

- More detailed guidance provided on establishing proposed release limits
- Proactive communication related to:
  - Current limits and controls are protective, and releases are safe
  - New limits emphasize reasonable precaution to control and defence-in-depth

4 CONCERN 4: APPLICATION OF ENVIRONMENTAL RELEASE TARGETS (ERTS)

Issue:

- Concern with lack of clarity in the meaning and application of environmental release targets
- Potential for confusion with respect to the wide array of environmental quality criteria/guidelines one could use to develop ERTs

CNSC Response:

- Created new section to clarify the role of environmental release targets and their application
- Provided quantitative methodology for developing exposure-based environmental release targets

IMPLEMENTATION AT NEW FACILITIES

- Within the licensing basis, new facilities will be required to:
  - Conduct a BATEA assessment
  - Establish proposed release limits
  - Establish action levels
  - Establish a commissioning plan for the treatment system
  - Commission treatment system or other control measures and confirm performance
- Once the facility is under normal operation
  - Conduct routine monitoring and assessment
  - Status quo unless Adaptive Management triggered

IMPLEMENTATION AT EXISTING FACILITIES

- Existing facilities met treatment technology requirements at the time of original licence
  - New BATEA assessment not needed - BATEA maintained through existing regulatory framework requirements
  - Periodic Safety Reviews (PSRs) (REGDOC 2.3.3)
  - Fitness for Service – Aging Management (REGDOC 2.6.3)
  - Continuous improvement of objectives and target(s) in Environmental Management System
- Will be required to update licensed release limits and action levels via existing cyclical updates (e.g., Environmental Risk Assessment)

SAFETY ENHANCEMENTS FROM THIS REGDOC

- Documents modern regulatory practices on
  - practical application of pollution prevention
  - design and commissioning of treatment systems
  - responding to potential action level and licensed release limit exceedances
  - implementation of adaptive management and appropriate response
- Closes a regulatory gap on establishing licensed release limits for hazardous substances
- Directly ties the regulatory control of releases to the licensing basis
  - ensures licensed release limits are based on established controls and procedures established in the licensing basis
  - minimizes the likelihood of a major release outside the licensing basis

CONCLUSION

This REGDOC:

- Provides consistent and formalized approach for controlling releases to environment
- Aligns with modern national and international standards and best practices, while considering the Canadian context
- Was developed through an iterative process with stakeholder engagement

RECOMMENDATION

CNSC staff recommend that:

The Commission approve **REGDOC-2.9.2**, *Environmental Protection: Controlling Releases to the Environment,* Version 1

QUESTIONS