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A Licence Renewal

Un renouvellement de permis

New Brunswick Power Corporation

Société d'énergie du Nouveau-Brunswick

Point Lepreau Nuclear Generating Station

Centrale nucléaire de Point Lepreau

Commission Public Hearing – Part 1

Audience publique de la Commission –
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Soumis par :

CNSC staff

Le personnel de la CCSN

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Summary

This CMD presents information about the following matters of regulatory interest with respect to New Brunswick Power Corporation, herein known as NB Power:

- Renewal of the power reactor operating licence (PROL) for the Point Lepreau Nuclear Generating Station (NGS).
- Compliance with the safety and control areas for the safe operation of the facility.
- Periodic safety review to identify and implement safety enhancements.

The following actions are requested of the Commission:

- Issue, pursuant to section 24 of the *Nuclear Safety and Control Act*, a Point Lepreau NGS PROL authorizing NB Power to carry out the activities listed in Part IV of the proposed licence from July 1, 2022 to June 30, 2042.
- Accept NB Power's 2020 Preliminary Decommissioning Plan and associated Financial Guarantee.
- Delegate the authority to CNSC staff as set out in section 5.8 of this CMD.

The following items are attached:

- The proposed PROL 22.00/2042
- The draft licence conditions handbook (LCH)
- The current PROL 17.01/2022

Résumé

Le présent CMD fournit des renseignements sur les questions d'intérêt réglementaire suivantes à l'égard de la Société d'énergie du Nouveau-Brunswick, ci-après appelée « Énergie NB » :

- Le renouvellement du permis d'exploitation d'un réacteur de puissance (PERP) pour la centrale nucléaire de Point Lepreau.
- La conformité aux domaines de sûreté et de réglementation pour l'exploitation sûre de l'installation.
- Le bilan périodique de la sûreté pour la détermination et la mise en œuvre des améliorations en matière de sûreté.

La Commission pourrait considérer prendre les mesures suivantes :

- Délivrer, conformément à l'article 24 de la *Loi sur la sûreté et la réglementation nucléaires*, un PERP pour la centrale nucléaire de Point Lepreau autorisant Énergie NB à exercer les activités énumérées à la partie IV du permis proposé, et ce, du 1er juillet 2022 au 30 juin 2042.
- Accepter le plan préliminaire de déclassement de 2020 d'Énergie NB et les garanties financières associées.
- Autoriser la délégation des pouvoirs énoncée à la section 5.8 du présent CMD.

Les pièces suivantes sont jointes :

- Le permis proposé, PERP 22.00/2042
- L'ébauche du manuel des conditions de permis (MCP)
- Le permis actuel, PERP 17.01/2022

Signed/signé le

22 December 2021/22 décembre 2021

Alexandre Viktorov, PhD

Director General

Directorate of Power Reactor Regulation

Directeur général

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EXECUTIVE SUMMARY

Canadian Nuclear Safety Commission (CNSC) staff acknowledge that the Peace and Friendship Treaties of the Maliseet, Passamaquoddy and Mi'kmaq peoples were signed within the location of the Point Lepreau Nuclear Generating Station.

New Brunswick Power Corporation (NB Power) has submitted an application to renew the current power reactor operating licence (PROL) for the Point Lepreau Nuclear Generating Station (Point Lepreau NGS) for a period of 25 years [1]. CNSC staff have assessed the application and present our conclusions and recommendations, along with the supporting rationale, to the Commission in this Commission Member Document (CMD).

NB Power is the owner and licensed operator of the Point Lepreau NGS, which is the only nuclear power plant in Atlantic Canada. The Point Lepreau NGS site is located on the Lepreau Peninsula, on the northern shore of the Bay of Fundy, which is 40 km southwest of Saint John, New Brunswick. The Point Lepreau NGS site consists of a single, refurbished, CANDU-6 pressurized heavy water reactor and a solid radioactive waste management facility.

The current Point Lepreau NGS PROL is a consolidated licence for both facilities. The PROL was issued on July 1, 2017 and will expire on June 30, 2022 [2].

The public, Indigenous Nations and communities, and other stakeholders were invited to participate in the relicensing process. The CNSC Participant Funding Program provided \$176,741.98 in funding to enable extensive participation.

The CMD outlines the results of CNSC staff's assessment of the licence application and supporting documentation, the proposed licensing basis, past performance in all safety and control areas (SCA), future safety improvement commitments and long-term operation considerations, among other areas.

CNSC staff confirmed that NB Power submitted an application, in accordance with [REGDOC-1.1.3, Licence Application Guide: Licence to Operate a Nuclear Power Plant](#), that met all regulatory requirements. CNSC staff confirmed that the licence application established programs and processes in all SCAs that constitute an adequate licensing basis.

CNSC staff assessed NB Power's performance in each SCA throughout the current licensing period and reported the results of the assessments to the Commission during public Commission Meetings for the *Regulatory Oversight Report for Nuclear Power Generating Sites* every year. The Point Lepreau NGS received a "satisfactory" integrated plant rating each year for the past 4 years. The preliminary performance ratings for 2021 confirm stable performance.

CNSC staff note that there were no serious process system failures, the availability of special safety systems met regulatory requirements, and radiation doses to workers and the public were well below regulatory limits, during the current licensing period. CNSC staff confirmed that NB Power maintained adequate provisions to protect the public and workers.

NB Power's performance throughout the current licensing period demonstrates stable safety performance and indicates that NB Power will continue to comply with applicable regulatory requirements throughout the proposed licence period.

CNSC staff confirmed that NB Power conducted a periodic safety review (PSR) in accordance with the requirements of [REGDOC-2.3.3, Periodic Safety Reviews](#). CNSC staff note that the PSR did not identify any major gaps between the current state of the nuclear power plant and modern requirements.

CNSC staff confirmed that NB Power prepared an appropriate integrated implementation plan (IIP) that identifies corrective actions and completion dates for closing the identified gaps. CNSC staff note that NB Power commits to implementing safety improvements to maintain the plant in a state that is comparable to that of a new nuclear power plant.

CNSC staff reviewed NB Power's request for a 25-year licence term and determined that the period requested was not adequately substantiated. CNSC staff's review concluded that NB Power's application supports a 20-year licence term.

CNSC staff reviewed NB Power's preliminary decommissioning plan (PDP) and confirmed that it meets applicable regulatory requirements. CNSC staff reviewed the associated financial guarantee and confirmed that adequate funds are available to cover decommissioning costs outlined in the PDP.

CNSC staff conclude that pursuant to section 24 of the *Nuclear Safety and Control Act*¹ (NSCA), NB Power is qualified to carry out the activities listed in the proposed licence, and will continue to make adequate provisions 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.

CNSC staff recommend the Commission:

1. renew the Point Lepreau NGS PROL authorizing NB Power to carry out the licenced activities listed in Part IV of the proposed licence for 20 years from July 1, 2022 to June 30, 2042
2. accept NB Power's 2020 Preliminary Decommissioning Plan and associated Financial Guarantee
3. delegate the authority to CNSC staff as set out in section 5.8 of this CMD

¹ S.C. 1997, c. 9.

This Commission Member Document (CMD) is presented in two parts.

Part One includes:

1. an overview of the matter being presented
2. general discussion pertaining to the SCAs that are relevant to this submission
3. discussion on consultation and engagement
4. discussion about other matters of regulatory interest
5. CNSC staff conclusions and recommendations
6. addenda material that complements items 1 through 5

Part Two includes:

1. information directly pertinent to the current and proposed power reactor operating licence
2. the associated draft licence conditions handbook (LCH)
3. any proposed changes to the licence conditions, licensing period, or formatting of an existing licence

PART ONE

1. OVERVIEW

1.1 Background

The Point Lepreau Nuclear Generating Station (Point Lepreau NGS) is owned and operated by New Brunswick Power Corporation (NB Power). The station is located on the Lepreau Peninsula in New Brunswick (NB), 40 km southwest of Saint John, NB.

The Point Lepreau NGS consists of a single CANDU-6 pressurized heavy water reactor which has a total installed capacity of 705 megawatts electrical (MWe). Point Lepreau NGS underwent a refurbishment in 2008 and was returned to service in 2012.

The site also includes the Solid Radioactive Waste Management Facility (SRWMF). The SRWMF is used for the storage of solid radioactive waste, including nuclear spent fuel, produced exclusively at the Point Lepreau NGS.

The required land ownership and controlling information (titles, registration, etc.) were submitted by NB Power in the licence renewal application [1].

Figure 1: Aerial view of the Point Lepreau Nuclear Generating Station



1.2 Highlights

In June 2021, NB Power submitted an application [1] for the renewal of the Point Lepreau NGS Power Reactor Operating Licence (PROL) for 25-years. The purpose of this Commission Member Document (CMD) is to provide Canadian Nuclear Safety Commission (CNSC) staff conclusions and recommendations to inform the Commission's decision on the licence application.

This CMD includes information on CNSC staff review of all safety and control areas (SCAs) with focused highlights on:

1. programs and processes that constitute the licensing basis
2. performance assessments in all safety and control areas (SCAs) during the current licensing period
3. periodic safety review findings and associated Integrated Implementation Plan (IIP) actions for the implementation of safety enhancements
4. long-term operation considerations
5. engagement with the public and Indigenous Nations and communities

1.3 Overall Conclusions

CNSC staff reviewed NB Power's licence application and supporting documents and confirmed that NB Power's application meets the applicable regulatory requirements and establishes an adequate licensing basis for continued operation.

CNSC staff assessed NB Power's performance during the current licence term to confirm compliance with applicable requirements. CNSC staff confirmed that NB Power's performance was satisfactory and demonstrated a trend of stable performance throughout the licensing period. CNSC staff note that NB Power's historical performance indicates that they will continue to comply with applicable regulatory requirements.

CNSC staff note that NB Power has committed through the IIP to implement safety enhancements during the proposed licensing period to continuously update the station to a level that is comparable to a new nuclear power plant.

CNSC staff reviewed NB Power's request for a 25-year licence term and determined that the period requested was not adequately substantiated. CNSC staff's review concluded that NB Power's application supports a 20-year licence term.

CNSC staff's review confirmed the following:

1. NB Power effectively managed the impact of COVID-19
2. NB Power maintained a sufficient number of qualified staff
3. radiation doses and radiological releases are well below regulatory limits
4. safety analyses were updated and considered the impact of ageing effects
5. NB Power has a clearly defined safe operating envelope
6. major components, structures and systems remain fit for service
7. NB Power makes provisions to protect workers, the public and the environment

CNSC staff reviewed NB Power's preliminary decommissioning plan (PDP) and confirmed that it met applicable regulatory requirements. CNSC staff reviewed

the associated financial guarantee and confirmed that adequate funds are available to cover decommissioning costs outlined in the PDP.

With respect to paragraphs 24(4)(a) and (b) of the NSCA, CNSC staff find that the applicant provided adequate evidence to demonstrate that NB Power:

1. is qualified to carry on the activity authorized by the licence
2. 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

1.4 Overall Recommendations

CNSC staff recommend the Commission:

1. renew the Point Lepreau NGS PROL authorizing NB Power to carry out the licenced activities listed in Part IV of the proposed licence for twenty (20) years from July 1, 2022 to June 30, 2042
2. accept NB Power's 2020 Preliminary Decommissioning Plan and associated Financial Guarantee
3. delegate the authority to CNSC staff as set out in section 5.8 of this CMD

2. MATTERS FOR CONSIDERATION

2.1 Environmental Reviews

CNSC staff reviewed the licence application to determine the type of environmental review that would be required, if applicable. CNSC staff determined that the *Impact Assessment Act* (IAA) does not apply because the proposed activities are not captured in the IAA's *Physical Activities Regulations* nor are they considered a project on federal lands.

CNSC staff conduct Environmental Protection Reviews (EPR) for all licence applications with potential environmental interactions, in accordance with the CNSC mandate under the NSCA and associated regulations. The EPR informs the Commission's conclusion on whether the proposal provides adequate protection of the environment and the health of people.

Accordingly, an EPR was conducted for this licence application. CNSC staff assessment included a review of the licence application, past environmental performance and supporting documents, such as, NB Power's Environmental Risk Assessment, Annual Compliance Monitoring Reports, and the Preliminary Decommissioning Plan. The EPR report includes a summary of past environmental assessments for the Point Lepreau NGS facility and is available [here](#) on the CNSC website.

As outlined in the EPR, CNSC staff confirmed that NB Power implements and maintains effective environmental protection measures to adequately protect the environment and the health of persons.

2.2 Relevant Safety and Control Areas

The licensing assessment and compliance oversight of any licensed facility or activity consist of a standard set of safety and control areas (SCAs).

The CNSC implements an SCA framework that has 14 SCAs which are grouped into three primary functional areas: Management, Facility and Equipment, and Core Processes. Each SCA addresses an aspect of the overall safety profile of a proposed set of activities and is sub-divided into specific areas (SpAs) that define the key components of each SCA.

An SCA framework establishes a consistent approach for setting clear expectations for NB Power to meet safety objectives, and continuously assess their performance against these objectives, to protect health, safety, security, and the environment in accordance with regulatory requirements.

It should be noted that the SCA framework does not limit the CNSC in its conduct of regulatory oversight activities. Additional topics or safety areas may be added, as needed, at any time.

See Addendum C, “Safety and Control Area Framework”, for further information about SCAs and Addendum C.2, “Specific Areas for Nuclear Power Plants”, for further information on the SCAs and specific areas (SpAs) that are relevant to nuclear power plant facilities.

CNSC staff assessed NB Power in all relevant SCAs as part of our assessment of the licence renewal application.

2.3 Matters of Regulatory Interest

The following table identifies matters that are relevant to this application beyond the SCAs.

Table 1: Matters of regulatory interest addressed in this CMD

MATTERS OF REGULATORY INTEREST
Area
Indigenous Consultation and Engagement
Public Engagement
Cost Recovery
Financial Guarantees
Fisheries Act Authorization
Licensee Public Information Program
Nuclear Liability Insurance
Nuclear Substances and Prescribed Equipment
Closure of Fukushima Action Items

MATTERS OF REGULATORY INTEREST
Area
Delegation of Authority

The relevant matters of regulatory interest are discussed in sections 4 and 5.

2.4 Regulatory and Technical Basis

The CNSC has an established and mature regulatory framework that sets comprehensive, robust, and modern requirements for the safe operation of nuclear power plants. The regulatory framework consists of the *Nuclear Safety and Control Act* (NSCA) and associated regulations, the licence and associated licence conditions handbook and regulatory documents and international standards referenced in the LCH.

The CNSC has an established suite of regulatory documents that outline requirements for licensee performance in each SCA.

CNSC staff evaluate licensees' performance in all applicable SCAs and SpAs to confirm compliance with applicable regulatory requirements and expectations outlined in the regulatory framework.

The regulatory and technical bases for the matters discussed in this CMD are provided in section 2, 3, 4 and 5 in this document.

For a nuclear power plant facility, the key requirements come directly from the following:

- [*Nuclear Safety and Control Act*](#)
- [*General Nuclear Safety and Control Regulations*](#)
- [*Radiation Protection Regulations*](#)
- [*Class I Nuclear Facilities Regulations*](#)
- [*Class II Nuclear Facilities and Prescribed Equipment Regulations*](#)
- [*Nuclear Substances and Radiation Device Regulations*](#)
- [*Packaging and Transport of Nuclear Substances Regulations, 2015*](#)
- [*Nuclear Security Regulations*](#)
- [*Canadian Nuclear Safety Commission Cost Recovery Fees Regulations*](#)
- [*Administrative Monetary Penalties Regulations*](#)
- [*Nuclear Non-proliferation Import and Export Control Regulations*](#)
- [*Canadian Nuclear Safety Commission Rules of Procedure*](#)

The proposed Point Lepreau NGS PROL outlines conditions that NB Power must comply with and the associated LCH, included in Part Two of this CMD, describes the compliance verification criteria and guidance on how to meet the

licence conditions, including international guidance documents, national and international standards and CNSC regulatory documents.

2.5 Highlights of NB Power's Licence Application

[REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant*](#), is a regulatory document that outlines the requirements and expectations for applying for a licence to operate a nuclear power plant (NPP). A licence renewal application must demonstrate due consideration to establishing an adequate and appropriate licensing basis that meets regulatory requirements such as those outlined in the NSCA, [General Nuclear Safety and Control Regulations](#) (GNSCR), [Class I Nuclear Facilities Regulations](#) and relevant modern codes and standards.

NB Power submitted an application, with supporting information, for a power reactor operating licence renewal in accordance with [REGDOC-1.1.3](#). CNSC staff reviewed NB Power's licence renewal application and confirmed that it was complete and contained sufficient supporting information to demonstrate that an adequate licensing basis has been established in each SCA to support continued operations.

CNSC staff also considered safety performance during the current licensing period and future safety enhancement commitments identified through a periodic safety review (PSR) as key inputs into the assessment of the application.

CNSC staff present the outcomes of our overall assessment of each SCA in Section 3 of the CMD.

CNSC staff note that NB Power applied for a 25-year licence but did not adequately substantiate the requested licence term. CNSC staff considered various key inputs, discussed in Section 2.7, and recommend a 20-year licence term.

CNSC staff note that in the licence application, NB Power:

- states that nuclear safety is their priority; ensuring that personnel, the public and the environment are protected through maintaining the highest standards to operate Point Lepreau NGS
- commits to ensuring a healthy safety culture, which is a foundation of their performance
- commits to invest in staff and ensure they are qualified and competent to operate the Point Lepreau NGS
- commits to invest in and improve safety at Point Lepreau NGS
- commits to and values open and transparent reviews of Point Lepreau NGS processes
- outlines their programs in place to ensure that Systems, Structures and Components (SSCs) important to safety are fit for service, are effectively maintained and to ensure that these SSCs continue to provide safe performance over the life of the Point Lepreau NGS

- demonstrates that processes such as Long-Term Asset Management, Equipment Reliability, and System Health Monitoring are in place to assure that Point Lepreau NGS systems and components are regularly reviewed, and that appropriate maintenance and testing is completed
- commits to invest in the Point Lepreau NGS to ensure Point Lepreau continues to meet or exceed industry standards to ensure continued long-term safe and reliable operations

In the licence application, NB Power has provided programmatic and process documents that demonstrate how they intend to operate the Point Lepreau NGS and that are consistent with the requirements and guidance of [REGDOC-1.1.3](#). The licence application and supporting documentation align with the NSCA, regulations, applicable CNSC regulatory documents, and modern codes and standards.

CNSC staff have determined that NB Power's licence renewal application for the continued operation of the Point Lepreau NGS has sufficient information that meets regulatory requirements and demonstrates that NB Power is qualified to continue undertaking the licensed activity and will make adequate provisions to protect the health, safety and security of persons and the environment.

CNSC staff confirmed that the licence application met all regulatory requirements and supports the renewal of the PROL for 20 years, by the Commission.

2.6 Periodic Safety Review

A periodic safety review (PSR) is a comprehensive evaluation of the design, condition, and operation of an NPP. It is an effective way to obtain an overall view of actual plant safety, the quality of the documentation, and to determine reasonable and practical improvements to ensure the implementation of continuous safety enhancements until the next PSR or, where appropriate, until the end of commercial operation.

Historically, the initial PSRs were all linked to refurbishments and all stations had operated over 20 years prior to conducting the first PSR.

NB Power began the commercial operation of the Point Lepreau reactor in 1983 with an expected design life of 25-30 years. In 2003, after 20 years of operation NB Power decided to refurbish the Point Lepreau NGS and continue its operation for another 25-30 years [3][4].

In view of this, NB Power submitted an integrated safety review, which is now known as a Periodic Safety Review or PSR-1 [3]. PSR-1 was reviewed and accepted by CNSC staff in 2010 [5]. PSR-1 was an assessment of the state of the plant and plant performance at that time to determine the extent to which the plant conforms to modern codes, standards and practices, and to identify any factors that would limit safe and continuous long-term operations for another 25-30 years [3][4].

PSR-1 led to an integrated implementation plan (IIP) which proposed design enhancements and improvements including the replacement of the reactor core

assembly components to confirm that the health of the reactor core assembly components, fuel channel management, fitness for service programs assessed against modern industry codes and standards, updates using the results of pressure boundary inspections, internal and external operating experience, joint industry project findings, and research and development. These enhancements were performed during the refurbishment outage of 2008 to 2012.

Other safety improvements included the installation of a calandria vault make-up line to supply emergency water make-up to the calandria vault, installation of containment filtered venting system to maintain containment integrity and filter radioactive releases, upgrades to the emergency power generators, upgrades to the fire protection system, installation of passive autocatalytic recombiners, digital control systems and post-accident monitoring systems among others [3]. NB Power completed refurbishment activities in 2012 and returned the plant to safe operation.

After 10 years of operation, post refurbishment, NB Power completed a second PSR (PSR-2) to demonstrate continued safe operation, which is consistent with the expectations of CNSC regulatory document [REGDOC-2.3.3, Periodic Safety Reviews](#) which was published in 2015.

According to [REGDOC-2.3.3](#), the objectives of a PSR are to determine the following:

- the extent to which the facility conforms to modern codes, standards and practices
- the extent to which the licensing basis remains valid for the next licensing period
- the adequacy and effectiveness of the programs and the SSCs for continued safe operation until the next PSR
- the improvements to be implemented to resolve any gaps identified in the review and timelines for their implementation

NB Power submitted the following documents to CNSC staff:

- PSR Basis Document
- Safety Factors Review Reports
- Global Assessment Report
- Integrated Implementation Plan

The current PSR (PSR-2), conducted by NB Power, did not identify major design changes to Point Lepreau NGS [6]. PSR-2 did identify areas for improvement that consisted of mainly procedural updates and alignment with regulatory documents and standards.

CNSC staff conducted an extensive review of PSR-2 between December 2018 to June 2021 and accepted NB Power's IIP [7]. The results of the PSR were used to

establish safety improvements to the plant (as captured in the IIP) which will be implemented over the proposed licence period.

NB Power, in its application, commits to complete additional PSRs, in accordance with [REGDOC-2.3.3](#), prior to the end of the PSR validity period. Performing a PSR every 10 years leads to enhancements and incremental improvements to address potential gaps with modern codes and standards periodically and ensures that the gap remains small as demonstrated by the current Point Lepreau NGS PSR-2.

The draft LCH for the proposed licensing period requires that NB Power complete PSRs every 10 years and implement the associated IIPs. As per REGDOC-2.3.3, the IIP must be submitted to CNSC staff for acceptance.

The conduct of PSRs and the development of the IIP is a regulatory requirement and part of the licensing basis. CNSC staff monitors the implementation of the commitments made in the IIP and reports to the Commission annually, during the annual Regulatory Oversight Report (ROR). Any deviation from the accepted IIP, having safety implications, would be brought to the Commission's attention through public proceedings.

Further details about the PSR and the IIP actions including the proposed enhancements are discussed within the SCA sections.

2.7 Licensing Term

The Commission has flexibility regarding the establishment of licence periods and licence conditions as per section 26 of the NSCA. CNSC staff note that there is no set licence duration identified in the applicable Acts and Regulations.

Historically, the Commission granted PROLs for a duration of up to 10 years. The CNSC has made significant improvements to its regulatory framework and regulatory oversight practices over the years. NB Power has also demonstrated stable and strong safety performance throughout the current licensing period.

NB Power's application asserts that the requested licence term of twenty-five (25) years aligns with end-of-life decisions to either refurbish or decommission the Point Lepreau NGS. CNSC staff assessments demonstrate that a 20-year licence is more closely aligned with end-of-life decisions since the post-refurbishment life extension of the plant is approximately 25-30 years [3][4].

The current licence application and the proposed licence do not include activities such as refurbishment or end of commercial operations. As a result, NB Power is required to seek Commission approval prior to changing the state of operations of the Point Lepreau NGS. CNSC staff estimate that this would be necessary in approximately 20 years.

2.7.1 Discussion

The mature regulatory framework and regulatory oversight

The original Atomic Energy and Control Board (AECB) licences were valid for two years, or one year if performance was lacking. The licensing term was used as

a tool for regulating in the absence of a fully developed and mature regulatory program and framework. This was partly based on the established regulatory confidence in a licensee's performance that was limited by the safety case for approximately two years into the future. This was an ineffective way of regulating facilities and was not in line with international best practices. Resources were spent on licence renewals rather than on performing continuous regulatory oversight. CNSC staff note that regulatory oversight is completely independent of the licensing term.

With the implementation of the NSCA, replacing the Atomic Energy Control Board (AECB) Act in the year 2000, the licensing process became more streamlined and systematic. The CNSC moved towards regulating NPP facilities by assessing their established programs and processes, and more specifically, by conducting systematic reviews in all safety and control areas. In addition, the annual report on Nuclear Power Plants was established as a tool for reporting on the CNSC regulatory oversight of NPPs to the Commission and the public.

The Commission considered the CNSC's sound regulatory framework, regulatory oversight and reporting practices and demonstrated stable industry performance, prior to granting licensing periods up to five years.

CNSC staff developed and adopted the use of the licence conditions handbook (LCH) to outline compliance verification criteria and guidance on how to meet the licence conditions. The LCH provides a mechanism to implement new and modern regulatory requirements once they are published. The extension of a licensing period was further supported by the requirement for NPP licensees to conduct a Periodic Safety Review (PSR). See section 2.6 for further discussion on the PSR. The Commission considered the implementation of the LCH and the new requirement for the PSR and approved a ten-year licensing cycle.

CNSC staff considered international precedence and benchmarking regarding longer term licences that range from 10 years to lifetime licences. CNSC staff noted that longer licence terms are implemented in conjunction with regulatory control measures for managing the long-term operation of facilities.

These control measures are mainly comprehensive safety reviews, including periodic evaluations of the overall plant design as per the International Atomic Energy Agency (IAEA) PSR framework for nuclear power plants, and continuous monitoring of operational performance [8][9].

The Atomic Energy Act of the United States Nuclear Regulatory Commission (U.S. NRC) authorizes licences for commercial power reactors to operate for up to 40 years. Research by the U.S. NRC established a comprehensive program for NPP aging that concluded most aging issues do not pose a risk that would prevent them for operating additional years beyond their original 40-year licence period. These licences can be renewed for an additional 20 years at a time. The licence renewal and review process in the United States provides continued assurance that the current licensing basis of each NPP will maintain an acceptable level of safety for the period of extended operation [10].

CNSC staff observed that some Organisation for Economic Co-operation and Development (OECD) countries, such as the Office for Nuclear Regulation (United Kingdom Nuclear Regulator), issue licences for the lifecycle of the facility; and the Czech Republic issue licences for an unlimited term.

For countries that do not issue plant lifetime licences; the licence periods range from 10 to 40 years [11] as outlined in Table 2 below.

Table 2: International licence periods and Periodic Safety Review requirements for nuclear power reactors

Country	Licence period	PSR frequency
Argentina	10 years	every 10 years
Belgium	plant lifetime	every 10 years
Canada	10 years	every 10 years
Finland	10 - 20 years	every 10 years
France	plant lifetime	every 10 years
Germany	32 years	every 10 years
South Korea	30 years, 40 years and 60 years	every 10 years
Netherlands	plant lifetime	every 10 years
Romania	30 years	case-by-case basis
Spain	10 years	every 10 years
Sweden	plant lifetime	every 10 years
United Kingdom	plant lifetime	every 10 years
United States	40 years, with 20-year renewal option	Regulatory oversight coupled with the back fitting rule as requested by the licensees

Regulators issuing licences with long terms use comprehensive PSRs to gain insights into safety issues affecting the continued operation of a facility and to show that NPPs are as safe as originally designed and that they will continue to be safe over the defined period of continued operation until the next comprehensive review. Regulators with short licence terms use the licence renewal process to obtain similar information. The prevailing international experience and feedback suggests, “a ‘term’ licence is largely a legal/administrative matter rather than a safety one” [12].

The CNSC’s regulatory framework establishes expectations and sets requirements for licensing basis programs and processes. The CNSC continued to make significant enhancements to the regulatory framework over the years which has led to the establishment of a mature and robust regulatory framework. CNSC staff have continued to improve regulatory oversight practices and tools and continue to conduct risk-informed and performance based oversight that provides a high level of assurance of the safety of licensees’ activities. CNSC staff have also

established appropriate and frequent means for reporting on CNSC staff's assessment of licensee's activities against the requirements in the regulatory framework, to the Commission.

Notable improvements to the regulatory framework, regulatory oversight and regulatory practices include, but are not limited to, the following:

1. The establishment and maintenance of a mature and comprehensive regulatory framework which sets robust and modern requirements for the safe operation of nuclear power plants.
2. The CNSC implements an SCA framework that provides a common approach that ensures comprehensive and consistent oversight of licensed activities and facilitates streamlined assessments, recommendations, and reporting to the Commission.

A consistent approach also sets clear expectations for NB Power to meet safety objectives, and continuously assess performance against these objectives, to protect health, safety, security, and the environment in accordance with regulatory requirements.

The use of a consistent framework promotes improved communications among CNSC staff, licensees, the Commission, members of Indigenous Nations and communities and members of the public.

It should be noted that the SCA framework does not limit the CNSC in its conduct of regulatory oversight activities. Additional topics or safety areas may be added, as needed, at any time.

3. The CNSC's licensing process includes the use of an LCH which clarifies the licence conditions and other relevant parts of the licensing basis. The LCH should be read in conjunction with the licence.

The LCH is organized in accordance with the SCA framework and is frequently updated during a licensing period to reflect a continuously evolving approach as new safety requirements and standards are developed and incorporated into new revisions of the LCH.

An LCH is a mechanism for ensuring that the CNSC is maintaining a modern set of regulatory requirements throughout the licensing term.

4. CNSC staff summarize the outcomes of regulatory oversight and highlights of the safety performance of Canadian nuclear power plants, and their associated waste management facilities during the annual Regulatory Oversight Report for Nuclear Power Generating Sites.

This forum provides CNSC staff with the opportunity to report annual licensee performance to the Commission and it allows licensees to provide supplemental information as required. The ROR process facilitates written interventions by members of the public and Indigenous Nations and communities.

5. Status Report on Power Reactors Updates, at every commission meeting provide a forum for CNSC staff to present routine updates, throughout the year. These updates provide the Commission information on the current operating status of power reactors and any issues that nuclear generating stations may be encountering. Licensees are also present at these updates to answer any questions from the Commission.
6. CNSC staff event initial reports (EIR) identify any potential issues that the Commission should be made aware of or that require the involvement of Commission Members in making a regulatory decision. This reporting mechanism is considered as early notification of significant events to the Commission Members and informs on the situation, the impact, and the status of controls in place to assure safety and security.
7. The draft LCH requires that NB Power conducts PSRs and implement the associated IIP, in accordance with [REGDOC-2.3.3, Periodic Safety Reviews](#), every 10 years.

As per [REGDOC-2.3.3](#), the IIP must be submitted to CNSC staff for acceptance. The IIP commitments cannot be changed without the concurrence of CNSC staff as outlined in the draft LCH for NB Power.

The conduct of PSRs and the development of the IIP is a regulatory requirement and part of the licensing basis. CNSC staff monitor the implementation of the commitments made in the IIP and report to the Commission annually, during the annual Regulatory Oversight Report (ROR). Any deviation from the accepted IIP, having safety implications, would be brought to the Commission's attention through public proceedings.

The conduct of PSRs every 10 years ensures that NB Power is implementing continuous improvements to support continued long-term operation and a licensing term of 20 years. Continuous PSRs ensure that the gap between modern requirements remain small.

8. NPP licensees are required to conduct an ERA every 5 years, in accordance with [REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures](#). [REGDOC-2.9.1](#) includes requirements for NB Power to implement provisions to ensure the adequate protection of the environment and the health, safety and security of persons.
9. CNSC staff plan to publish an EPR report every 5 years that will include engagement with Indigenous Nations and communities and interested members of the public.
10. NPP licensees are required to follow reporting requirements set out in [REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants](#). [REGDOC-3.1.1](#) sets out the requirements for reports, notifications and filing of specific records to the CNSC by NPP licensees. Reporting includes event

reports for situations or events of higher safety significance and that may require short-term action by the CNSC.

Reporting requirements also include routine scheduled reports on various topics that are required for longer-term compliance and monitoring, including:

- a. A 5 year update to the final safety analysis report based on [REGDOC-2.4.1, Safety Analysis: Deterministic Safety Analysis](#). This regulatory document sets requirements such that during the construction, operation or decommissioning of an NPP, adequate safety analyses are completed.
 - b. A 5-year update to the station security report which outlines an update of the previous submission or when requested by the CNSC. The report contains current and updated information required from sections 3 and 16 of the [Nuclear Security Regulations](#) that reflect changes to the site or nuclear facility.
11. NPP licensees are required to conduct an update to the Probabilistic Safety Assessment every 5 years in accordance with [REGDOC-2.4.2, Probabilistic Safety Assessment \(PSA\) for Reactor Facilities](#). This report outlines the models and analyses that have been appropriately reviewed and revised and that take into account the most up-to-date and relevant information, methods and revision summary with the differences between the existing probabilistic safety assessments referenced in the licensing basis and updated probabilistic safety assessments. The revision summary is publicly available.
12. NPP licensees are required to provide an update to the Preliminary Decommissioning Plan every 5 years in accordance with [REGDOC-2.11.2, Decommissioning](#). This regulatory document defines decommissioning 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 with due regard for the health and safety of people and the environment.
13. CNSC staff are committed to building relationships and trust, and continuing to engage with Indigenous Nations and communities regarding the nuclear industry and to act within the CNSC's mandate to disseminate objective scientific, technical, and regulatory information. Nuclear activities that are regulated by the CNSC exist throughout Canada and as such, it is important for staff to understand the history and cultural importance of the land before making a recommendation to the Commission on what impact nuclear activities may pose. CNSC staff will continue to listen and engage in a meaningful way to understand the cultural importance for the use of the land.

CNSC staff continue to offer the establishment of TORs for facilitating meaningful engagement with any interested Indigenous Nation. CNSC staff

remain committed to engage regardless of whether there is an established TOR or not.

To ensure meaningful engagement persists throughout the proposed licence term, CNSC staff will continue to build on our trust strategy and outline mechanisms to make it functionally effective with interested Indigenous Nations and Communities. See Section 4.0 for more details.

The above regulatory oversight activities and reporting are in place for life cycle regulation and continuous improvement, along with rigorous CNSC staff scrutiny.

In addition, during the proposed licensing term, NB Power has continued to meet regulatory requirements and expectations and has consistently produced satisfactory results or higher across all SCAs. See section 3.0 for details on CNSC staff's assessment of NB Power's performance during the current licensing period.

CNSC staff note that NB Power has improved its licensing basis as evidenced by the fact that the PSR-2 did not identify any major gaps. Many areas for improvement were procedural in nature and were related to the implementation of newer regulatory documents.

CNSC staff recommend 20 years as the optimum licence term for NB Power to continue operating the Point Lepreau NGS because it is the estimated timeframe where NB Power will have to make a decision on whether to refurbish Point Lepreau NGS or implement end of commercial operations measures.

The following items support CNSC staff's recommendation of a 20-year licensing term:

1. CNSC staff are proposing a standardized licence, with standard licence conditions to the Commission.
2. There are no new licence conditions in the proposed licence. The key difference between the current licence and the proposed licence is the licensing term.
3. There are no major activities being conducted throughout the 20-year proposed term. If there are any expected changes to the licensed activities, NB Power would be required to seek Commission approval before proceeding, irrespective of the licensing term.
4. Effective regulatory oversight and control is maintained irrespective of the licensing term.
5. A decrease in safety performance or a significant event would be reported to the Commission through established reporting mechanisms.
6. The Commission has the right to revoke or amend the licence at any time including, at the request of NB Power.
7. CNSC staff estimate that NB Power would be required to request a change in operations for end of commercial operation or refurbishment in approximately

20 years. NB Power stated in their PSR-1 basis document that the post-refurbishment life extension of Point Lepreau NGS is 25 to 30 years, which aligns with a 20 year licence term [3]. In addition the Record of Decision from the Commission Hearing in 2012 states that the refurbishment activities extended the life of the Point Lepreau NGS by 25 to 30 years [4].

8. As referenced in NB Power's safety report for the Point Lepreau NGS [13] and the LCH Section 4.1 [14], the pressure tubes were designed for an estimated life of 210,000 equivalent full power hours (EFPH) of operation. Operation of any unit with pressure tubes which service extends beyond 210,000 EFPH is not permitted unless approved by the Commission in accordance with licence condition 1.1. The current limit for EFPH is part of the design basis and the licensing basis and aligns with a 20-year licence term.
9. The schedule for NB Power's PSRs is every 10 years which aligns with the 20-year licensing term.

CNSC staff have considered the key inputs and recommend 20 years as an optimum term.

2.7.2 Conclusion

CNSC staff have a robust regulatory framework and conduct continuous regulatory oversight activities that allow for agile refocusing on areas with downward performance trends. CNSC staff are confident that oversight activities and reporting will continue to be effective regardless of the licence duration.

CNSC staff have determined that NB Power's post refurbishment life extension is approximately 25-30 years which would require a decision regarding another refurbishment or end of commercial operations in approximately 20 years.

2.7.3 Recommendation

CNSC staff recommend a 20-year licence period.

3. GENERAL ASSESSMENT OF SAFETY AND CONTROL AREAS

This section provides information, organized by Safety and Control Areas (SCA). The sub-sections are organized according to the specific areas of each SCA. In some cases, specific areas are listed in the order where the information is most relevant to the overall approach of the SCA.

CNSC staff assessed NB Power's licence application and supporting documentation for each SCA and confirmed that their programs and processes met the applicable requirements outlined in the regulatory framework and that NB Power established an adequate licensing basis for continued operations. See section 2.2 for details on the SCA and SpA sections and section 2.4 for further discussion on the regulatory framework.

CNSC staff assess NB Power's performance throughout the current licence period against the applicable regulatory requirements outlined in the regulatory framework including the current licence and associated licence conditions handbook.

CNSC staff confirmed that NB Power demonstrated strong and stable performance that was rated as satisfactory. CNSC staff conclude that NB Power's past performance indicates that they will continue to comply with applicable regulatory requirements and expectations during the proposed licence period.

Table 3 outlines CNSC staff's ratings of NB Power's performance in each SCA from 2017 to 2020. CNSC staff note that the preliminary ratings for 2021 confirm stable performance.

CNSC staff reported the results of the 2017, 2018, 2019 and 2020 assessments to the Commission during public Commission Meetings for the *Regulatory Oversight Report for Nuclear Power Generating Sites, every year*. The details of inspections completed during the period of 2017 to 2020 can be found in [Regulatory Oversight Report - Nuclear Power Generating Sites - Canadian Nuclear Safety Commission](#) for those years.

The non-compliant findings for the current licensing period were all rated as a negligible or low safety significance at the time of publishing this CMD. The information contained in the various sections of the SCAs will include the results from 2021 and an update on corrective actions that are in progress from previous years.

The rating level for each SCA indicates the overall compliance with regulatory requirements. Additional information on rating levels is provided in Addendum B.

Table 3: Point Lepreau NGS performance ratings for 2017 – 2020

Safety and control areas	Ratings			
	2017	2018	2019	2020
1. Management system	SA	SA	SA	SA
2. Human performance management	SA	SA	SA	SA
3. Operating performance	SA	FS	SA	SA
4. Safety analysis	FS	FS	SA	SA
5. Physical design	SA	SA	SA	SA
6. Fitness for service	SA	SA	SA	SA
7. Radiation protection	SA	SA	SA	SA
8. Conventional health and safety	FS	FS	SA	SA
9. Environmental protection	SA	SA	SA	SA
10. Emergency management and fire protection	SA	SA	SA	SA
11. Waste management	SA	SA	SA	SA
12. Security	SA	SA	SA	SA
13. Safeguards and non-proliferation	SA	SA	SA	SA
14. Packaging and transport	SA	SA	SA	SA
Integrated Plant Rating	SA	SA	SA	SA

*SA: Satisfactory FS: Fully satisfactory

Note: As of 2019, the CNSC discontinued use of the “fully satisfactory” rating. However, the definitions and references to “fully satisfactory” appear in this CMD to maintain historical context and consistency with previous performance ratings.

CNSC staff also assessed NB Power’s IIP commitments for each SCA and determined that the corrective actions and associated timelines were appropriate. Further discussion on the PSR and IIP commitments are included in the SCA and SpA sections.

CNSC staff confirmed that the licensing application established an appropriate licensing basis for continued safe operations, past performance indicates continued compliance with applicable regulatory requirements and safety improvement actions demonstrate a commitment to continuously improving the plant and maintaining a state that is comparable to a new plant.

3.1 Management System

The management system SCA covers the framework that establishes the processes and programs required to ensure an organization achieves its safety objectives,

continuously monitors its performance against these objectives, and fosters a healthy safety culture.

This CMD covers the following specific areas of management system:

- management system
- organization
- performance assessment, improvement and management review
- operating experience
- change management
- safety culture
- configuration management
- records management
- management of contractors
- business continuity

Licence condition 1.1 in the proposed PROL pertains to implementing and maintaining a management system. Compliance verification criteria are detailed in section 1 of the proposed LCH.

3.1.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the management system over the current licensing period:

MANAGEMENT SYSTEM			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's management system meets regulatory requirements.			

3.1.2 Discussion

During the current licensing period, NB Power's management system at the Point Lepreau NGS was assessed against the applicable requirements outlined in the regulatory framework including Canadian Standard Association (CSA) N286, *Management system requirements for nuclear facilities*. CNSC staff confirmed that NB Power's programs and processes and associated outcomes met performance objectives and regulatory requirements.

Details of CNSC staff assessment in this SCA are presented in the following sections.

Management system and organization

CNSC staff confirmed that NB Power maintains and implements a management system at Point Lepreau NGS in accordance with the requirements of Canadian Standard Association (CSA) N286, *Management system requirements for nuclear facilities*. During the licence period, NB Power transitioned from CSA N286 edition 2005 to the 2012 edition to meet the modern requirements in CSA N286-12.

CNSC staff routinely performed compliance verification activities to verify NB Power's compliance with management system and organization requirements and confirmed that NB Power met requirements. There are currently no open action items in this area.

CNSC staff conclude that NB Power meets regulatory requirements in this area.

Performance assessment, improvement, and management review

CNSC staff confirmed that NB Power has nuclear oversight processes for periodically assessing the effectiveness of their management system. These processes include independent assessments (audit), self-assessments and management reviews for ensuring that NB Power complies with the requirements of CSA N286-12.

During the current licensing period, NB Power's management system document, *Nuclear Management Manual*, was used to meet the requirements of CSA N286-12. The *Nuclear Management Manual* describes all governing processes that meet the management system principles identified in CSA N286-12. Prior to implementation NB Power provides revisions of the *Nuclear Management Manual* to CNSC staff for their concurrence.

CNSC staff conclude that NB Power meets regulatory requirements in this area.

Operating experience

CNSC staff confirmed that NB Power implements an Operating Experience (OPEX) process that enhances safety and reliability by encouraging communication between all levels of plant operations and the nuclear industry.

During the licensing period CNSC staff conducted compliance verification activities including a Type II inspection on operating experience.

NB Power's governing document for the OPEX program, *SI-01365-T032, Using Operating Experience*, requires NB Power to evaluate lessons learned from industry operating experience and communicate it to NB Power staff. During the current licensing period, CNSC staff confirmed that NB Power met the requirements of their OPEX program and conclude that NB Power meets regulatory requirements in this area.

Change management

CNSC staff confirmed that NB Power has a process in place to manage changes made to the organization, processes, designs, structures, systems, components,

equipment, materials, software and documents. The process requires that changes are identified, justified, reviewed and approved before they are implemented.

Change management is extensively verified through compliance verification activities. In 2020, CNSC staff identified a non-compliance related to change management in training not being performed in a systematic way in NB Power's certified training programs [15]. CNSC staff rated this finding as low safety significance. CNSC staff reviewed the corrective actions wherein, NB Power created a process to consolidate and track operations training actions from all related training audit findings [16]. CNSC staff determined that the corrective actions met regulatory requirements [17].

During the current licensing period, NB Power's change management process was achieved based on the governing document *PRR-0060-DM-01, Direct and Manage the Business*, and *SI-01365-A076, Managing Change* and is aligned with industry best practice.

CNSC staff verified that changes were controlled as per NB Power governance and conclude that NB Power meets the regulatory requirements in this specific area.

Safety culture

The CNSC published [REGDOC-2.1.2, Safety Culture](#), in April 2018. This document sets out requirements and guidance for the licensee to foster a healthy safety culture and conduct periodic safety culture assessments.

Currently, NB Power is conducting a safety culture assessment at Point Lepreau NGS. Throughout the licensing period NB Power demonstrated a strong commitment to maintaining safety culture.

Configuration management

CNSC staff confirmed that NB Power has implemented a configuration management process for identifying and documenting the characteristics of the facility systems, structures and components (including computer systems and software), and for ensuring that changes to these characteristics are properly managed, recorded and incorporated into the facility documentation. This ensures that all the systems important to safety are in accordance with the design requirements as expressed in the design documentation.

Configuration management is routinely verified through compliance verification activities. In 2021, there were no non-compliant findings resulting from inspections in this area.

During the current licensing period, NB Power operated within the licensing basis as outlined in their LCH using the following governance documents, *PRR-00660-OP-01, Control and Monitor Station Equipment*, *PRR-00660-MA-02, Provide Planning and Scheduling Services* and *PRR-00660-MA-03, Perform Maintenance*.

CNSC staff conclude that NB Power meets regulatory requirements for this area.

Records management

CNSC staff confirmed that NB Power has implemented a process for the control of records that ensures that records are readable, complete, identifiable, traceable, retrievable, preserved and retained as specified.

Records management is comprehensively verified through compliance verification activities. During the maintenance planning and scheduling Type II inspection conducted in 2021 three (3) items did not meet the records management requirements. Corrective actions are in progress [18].

During field inspection conducted in FY 21/22 Quarter 2 there were a few instances of negligible safety significance where the latest revision of a document was not available for use at the location where the document is required for reference [19]. Immediate actions were taken by NB Power to ensure the correct document revision is available for use in accordance with station expectations and regulatory requirements.

During the current licensing period, NB Power's process for records management was controlled by governance document *PRR-00660-SU-09, Provide Documents and Records* process.

CNSC staff conclude that NB Power meets regulatory requirements for this area.

Management of contractors

CNSC staff confirmed that NB Power has implemented a process for supply chain and contractor management that ensures materials and services provided to the Point Lepreau NGS meet specified requirements.

In 2021, CNSC staff determined that NB Power's procuring document was not being updated and resolution reports were not consistently categorized as required for NB Power's Contractor Management Process [20]. CNSC staff have determined that these findings are of negligible safety significance. CNSC staff is currently reviewing NB Power's corrective action plans [21].

During the current licensing period, NB Power's process to provide oversight in managing contractors was achieved using its governance document *SDP-01368-PD09, Providing Oversight of Supplemental Personnel*.

CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Business continuity

CNSC staff confirmed that NB Power has implemented business continuity processes, documented in *SDP-78660-0001, Pandemic Response Plan*, to address and minimize the impact of disruptions, caused by both internal and external factors, which affect the safe operation of the facility.

CNSC staff identified that NB Power updated their business continuity processes to include COVID-19 mitigating strategies at the Point Lepreau NGS. NB Power continually updated station expectations for workers by aligning with the New

Brunswick Office of the Chief Medical Officer of Health. These COVID-19 expectations included:

- Establishment of the Incident Command Section (ICS) upon the initial pandemic outbreak in Canada to track the spread of COVID-19 and minimize an outbreak at Point Lepreau NGS.
- Initially, only essential staff, such as, those required to maintain minimum shift complement were allowed on-site.
- Prior to staff returning to work at site, a return to site policy was developed and implemented.
- Workers reporting to site were pre-screened by their direct supervisor prior to arrival and were instructed not to come to work if symptomatic.
- Once on-site, workers were to proceed immediately to a screening area where temperatures were taken and questions regarding signs of illness and travel history were asked.
- Workers were expected to wear facial coverings, and updates to procedures included outlining when and where facial coverings were to be worn and how they should be worn.
- Applying occupancy signage in numerous spaces including common areas, offices and meeting rooms and floor stickers indicating directional flow along with physical distancing requirements in high traffic areas and hallways.
- Installing sanitization stations throughout all buildings and providing guidance on sanitization use, prior to and after, the use of certain equipment such as radiation monitors.
- Providing guidelines for carpooling and workspaces.
- Establishing a COVID Response Team (CRT) including a phone number and e-mail for workers with COVID-19 related questions.
- Providing an employee and family assistance program for workers.

3.1.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.1.3.1 Past Performance

CNSC staff have assessed NB Power's programs corresponding to the CNSC's management system SCA, as implemented at the Point Lepreau NGS. During the current licensing period, NB Power met regulatory requirements for the management system SCA. Several identified non-compliances were of negligible or low safety significance. Corrective actions are presently progressing in areas

such as management of contractors and continue to be monitored by CNSC staff through compliance verification activities.

3.1.3.2 Regulatory Focus

CNSC staff will conduct follow-up verification activities of corrective actions being implemented by NB Power, and will continue to monitor the performance of NB Power's management system.

To ensure NB Power conducts their business activities in a safe manner, CNSC staff will continue compliance oversight related to business continuity. CNSC site inspectors verify that NB Power follows the latest COVID-19 pandemic recommendations and guidance provided by the Government of New Brunswick and the New Brunswick Chief Medical Officer of Health. As these recommendations and guidance change, CNSC compliance regulatory oversight criteria are also updated.

In addition, CNSC staff plan to assess the implementation of [REGDOC-2.1.2, Safety Culture](#). This assessment will include regulatory review of the 2021 safety culture assessment and a thorough review of updated documentation related to NB Power's safety culture self-assessment process, to ensure the methodology is comprehensive, systematic, and rigorous. The review will also assess the implemented mechanisms used to monitor and foster a healthy safety culture.

3.1.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP actions that NB Power submitted on April 30, 2021 [6] include enhancement plans regarding the following specific areas of the management system SCA.

NB Power is improving the Configuration Management processes for Environmentally Qualified Equipment. NB Power will be addressing the configuration process by consolidating Point Lepreau NGS process documents to ensure effective Environmental Qualification (EQ) configuration management across all design, operations, and maintenance documents. The EQ assessment process model will align with the requirements of CSA N286-12, and EQ program requirements under CSA N290.13-05. The required date of completion of this IIP action is December 2024.

Based on performance of the current program, the timelines in the IIP actions are acceptable to CNSC staff. CNSC staff will review all submissions related to the implementation of these standards and monitor program implementation through the conduct of compliance verification activities. This will ensure that the management system processes and programs for the Point Lepreau NGS meet organizational safety objectives and demonstrate a healthy safety culture.

3.1.4 Conclusion

NB Power continues to implement and maintain effective management system processes at the Point Lepreau NGS in accordance with regulatory requirements. CNSC staff confirmed that NB Power has committed to implementing measures

to meet applicable modern codes and standards. Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.2 Human Performance Management

The human performance management SCA covers the activities that enable effective human performance at nuclear facilities through the development and implementation of processes that ensure licensees have sufficient personnel in all relevant job areas; and that these personnel have the necessary knowledge, skills, procedures and tools to safely carry out their duties.

This CMD covers the following specific areas of human performance management:

- human performance program
- personnel training
- personnel certification
- work organization and job design
- fitness for duty

Licence conditions pertaining to human performance management (LC 2.1), minimum shift complement (LC 2.2), personnel training (LC 2.3) and the certification training and examination program (LC 2.4) are included in the proposed PROL. Compliance verification criteria are detailed in section 2 of the proposed LCH.

3.2.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the human performance management SCA over the current licensing period:

HUMAN PERFORMANCE MANAGEMENT			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's human performance management programs meet regulatory requirements.			

3.2.2 Discussion

NB Power has implemented and maintains human performance management programs in order to ensure a sufficient number of qualified workers are available

in all relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties. NB Power programs in the area of human performance, personnel training, initial and requalification certification processes, minimum shift complement and fitness for duty ensure continued satisfactory performance in this SCA.

Details of CNSC staff assessment in this SCA are presented in the following sections.

Human performance programs

CNSC staff confirmed that NB Power has implemented and maintained comprehensive Human Performance Programs (HPP) and has continued to improve them throughout the current licensing period. NB Power's HPP are documented in *SI 01365-A131, Human Performance Process*.

Human performance programs is routinely verified throughout compliance verification activities. In 2021, no areas of concern were identified.

CNSC staff determined that NB Power meets regulatory requirements in this specific area.

Personnel training

CNSC staff confirmed that, during the current licensing period, NB Power continuously implemented measures to improve its training system and associated programs, including strengthening the training-related processes and procedures. CNSC staff observed that NB Power conducted multiple reviews, inspections and external audits that led to the development and implementation of a *Training Excellence Plan*.

The *Training Excellence Plan* includes, but is not limited to the following:

- addressing items identified internally and by industry peers to improve training department performance
- improvement of change management in the training department
- improvement of the Control Room Operator in Training (CROIT) program
- addressing identified documentation gaps in the operations training program

CNSC staff reviewed NB Power's *Training Excellence Plan* and conclude NB Power's training system continues to be based on the Systematic Approach to Training (SAT) and is compliant with CNSC requirements in [REGDOC-2.2.2, Personnel Training](#).

CNSC staff conducted compliance verification activities on the training processes to verify that they are defined, designed, developed, implemented, evaluated, and managed according to NB Power's SAT-based training system and in accordance with regulatory requirements.

Overall, CNSC staff found that NB Power has implemented all training programs in accordance with its training system. CNSC staff identified compliant and non-compliant findings.

During an inspection of the fall 2021 emergency exercise [22] it was identified that two evaluators were not evaluation qualified. Both individuals who were evaluating the exercise without an evaluation qualification could be considered SMEs in performing the tasks of the areas they were evaluating. The safety significance of this finding is negligible.

During an inspection of NB Power's Non-Certified Training Programs in September 2021 items of negligible and low safety significance were identified related to training change management, training analysis, and training evaluation in the Emergency Response Team (ERT) training program documentation [23].

In June 2020, CNSC staff identified findings of negligible significance related to training change management, training database alignment, and alignment of Control Room Operator and Shift Supervisors (CRO/SS) training program documentation [24]. NB Power's corrective action plan was reviewed and accepted by CNSC staff. The proposed corrective actions will be implemented over a period of approximately two years, CNSC staff requested that NB Power provide status updates on the progress of the corrective actions. CNSC staff are satisfied with NB Power's progress on addressing the training gaps and continue to monitor the implementation of the corrective action plans through ongoing CNSC staff compliance verification activities.

During the licence period, NB Power revised the process documents for the implementation of SAT to align with the industry best practices with references to INPO document *NISP-TR-01, Systematic Approach to Training* and NB Power document *SI-01365-TR25, Systematic Approach to Training Process*.

CNSC staff determined that NB Power met the regulatory requirements in this specific area.

Personnel certification

CNSC staff confirmed that NB Power has implemented a personnel certification process that ensures workers assigned to positions that have a direct impact on the safe operation of the facility are fully qualified to perform the duties of their position. The certification programs cover the positions of Senior Health Physicist (SHP), CRO and SS. NB Power's process is in accordance with [REGDOC-2.2.3, Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants](#).

CNSC staff reviewed NB Power's "Operations Staffing Plans" which outline how certified staffing levels are managed. CNSC staff determined that NB Power maintained a sufficient number of qualified personnel for all certified positions. CNSC staff reviewed NB Power's applications for initial certification and renewal of certifications. CNSC staff determined that the certified staff at Point Lepreau NGS are qualified to perform the duties of their position.

CNSC staff conducted compliance verification activities to verify that written and simulator-based certification examinations and requalification tests were administered in accordance with regulatory requirements.

CNSC staff conducted a field inspection on the retention of records supporting initial and renewal of certification in 2018 [25], CNSC staff identified three non-compliant findings regarding the retention of records where records for the Certified Operations Training Program were not always complete or retrievable. CNSC staff determined that the findings were of low safety significance and corrective actions taken by NB Power met regulatory requirements [25]. CNSC staff conducted another field inspection on the retention of records supporting initial and renewal of certification in 2021 [26]. CNSC staff determined that NB Power met regulatory requirements.

CNSC staff conclude that the personnel certification process for certified personnel at Point Lepreau NGS meets regulatory requirements.

Work organization and job design

Minimum shift complement

The minimum shift complement (MSC) is the minimum number of qualified workers who must be present at all times to ensure the safe operation of the nuclear facility and to ensure adequate emergency response capability. NB Power's MSC includes a Shift Supervisor and Control Room Operator who are certified by CNSC staff, power plant operators, maintainers and an Emergency Response Team (ERT) [27].

CNSC staff confirm that NB Power has implemented a change to move from a five-crew to a six-crew shift schedule as part of the implementation of [REGDOC-2.2.4, Fitness for Duty: Managing Worker Fatigue](#). This new schedule results in the impacted departments having a larger pool of employees available to support the minimum complement.

NB Power must report MSC violations to the CNSC in accordance with [REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants](#). Over the licensing period, NB Power reported between one and three MSC violations annually. All were of short duration, and in all cases NB Power implemented the appropriate compensatory measures until replacement staff arrived, including entering quiet mode in which non-essential activities such as reactor fueling were postponed. At no time was the safety of Point Lepreau NGS compromised.

CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Fitness for duty

CNSC staff have confirmed that NB Power has a fitness for duty program that includes a range of provisions to provide reasonable assurance that workers are psychologically and physically fit for duty [28]. Over the course of the licensing period, the CNSC published three regulatory documents related to fitness for duty. [REGDOC-2.2.4, Fitness for Duty: Managing Worker Fatigue](#), [REGDOC-](#)

[2.2.4, Fitness for Duty, Volume II: Managing Alcohol and Drug Use](#), and [REGDOC-2.2.4, Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness](#) apply to NB Power staff who fill safety-sensitive positions, including operations personnel, ERT members and nuclear security officers. NB Power has implemented or has provided implementation plans that were accepted by CNSC staff for these regulatory documents. Further detail is provided in the three sub-sections below.

Fatigue management and hours of work

As part of their fitness for duty provisions, NB Power has procedures that limit hours worked by staff and have provisions for monitoring for signs of fatigue [28]. NB Power has two documents pertaining to hours of work, that are included in the list of documents that require CNSC staff to receive notification prior to the implementation of any changes [14]. Over the licensing period, NB Power reported in Quarterly Nuclear Power Plant Personnel Reports that certified staff have been in full compliance with the station's limits on hours of work. Several field inspections were also conducted by CNSC staff over the course of the licensing period that verified that NB Power is controlling hours of work and shift schedules of duty crew workers in accordance with their procedures.

To ensure regulatory clarity and consistency in the area of worker fatigue, the CNSC published [REGDOC-2.2.4, Fitness for Duty: Managing Worker Fatigue](#) in 2017 [29]. This regulatory document specifies requirements and guidance for managing worker fatigue at all high-security sites, with the aim of minimizing the potential for errors that could affect nuclear safety and security. NB Power had committed to implement the requirements related to normal operation by September 30, 2020, with full implementation by June 30, 2022. However, as a result of challenges related to the COVID-19 pandemic, NB Power requested an extension to their implementation for normal operations to March 2021 which was accepted by CNSC staff [30]. NB Power's commitment to implement the regulatory document for outages in 2022 was unaffected.

Managing alcohol and drug use

Managing alcohol and drug use is another important aspect that affects fitness for duty. To strengthen CNSC staff regulatory oversight related to alcohol and drug use, and to ensure regulatory clarity and consistency in the area, the CNSC published [REGDOC-2.2.4, Fitness for Duty, Volume II: Managing Alcohol and Drug Use](#), in 2017. This document sets out requirements and guidance for managing fitness for duty of workers occupying safety-sensitive and safety-critical positions in relation to alcohol and drug use at all high-security sites. NB Power submitted its implementation plan in early 2018, which CNSC staff found to be satisfactory. In late 2018, NB Power along with its industry peers, requested an amendment to include oral fluid testing to supplement the urinalysis testing required by the regulatory document. The request to update the document was accepted, and version 3 was developed and published on January 22, 2021. CNSC staff accepted NB Power's revised implementation dates, specifically NB Power

committed to implement version 3 by July 22, 2021 with the exception of random testing which would be implemented by January 22, 2022 [31].

Nuclear security officer medical, physical, and psychological fitness

[REGDOC-2.2.4, Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness](#) was published in September 2018 and replaces RD-363 with the same title. The new regulatory document updated the physical fitness test. NB Power implemented the regulatory document as of November 2019 [32].

CNSC staff conclude that NB Power meets regulatory requirements for fitness for duty over the licensing period and has worked towards the implementation of new CNSC requirements.

3.2.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.2.3.1 Past Performance

CNSC staff have determined NB Power's programs under the human performance management SCA at Point Lepreau NGS met regulatory requirements.

3.2.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the human performance SCA, including personnel training and certification, minimum shift complement, fitness for duty including fatigue management, work hours, managing alcohol and drug use.

In addition, CNSC staff regulatory focus during the next licensing period will be to verify NB Power's implementation of the following regulatory documents:

- [REGDOC-2.2.4, Fitness for Duty: Managing Worker Fatigue](#)
- [REGDOC-2.2.4, Fitness for Duty, Volume II: Managing Alcohol and Drug Use](#)
- [REGDOC-2.2.4, Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness](#)

3.2.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP actions that NB Power submitted on April 30, 2021 [6] includes enhancement plans regarding the following specific areas of the human performance management SCA: human performance program, personnel training, personnel certification, work organization and job design, and fitness for duty to be aligned with best industry practice.

CNSC staff confirm that NB Power completed all committed IIP actions under this SCA.

CNSC staff will continue to monitor the implementation of NB Power's human performance management programs through the conduct of compliance verification activities to ensure NB Power has personnel with the necessary knowledge, skills, procedures and tools to safely carry out their duties.

3.2.4 Conclusion

NB Power continues to implement and maintain effective human performance management programs at the Point Lepreau NGS in accordance with regulatory requirements. CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.3 Operating Performance

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

This CMD covers the following specific areas of operating performance:

- conduct of licensed activity
- procedures
- reporting and trending
- outage management performance
- safe operating envelope
- severe accident management and recovery
- accident management and recovery

Licence conditions pertaining to operations program (LC 3.1), approval to restart after a serious process failure (LC 3.2), reporting requirements (LC 3.3) and periodic safety review (LC 3.4) are included in the proposed PROL. Compliance verification criteria are detailed in section 3 of the proposed LCH.

3.3.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the operating performance SCA over the current licensing period:

OPERATING PERFORMANCE			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	FS	SA	SA
Comments			

NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude that NB Power's programs within the operating performance SCA meet regulatory requirements.

3.3.2 Discussion

NB Power continues to operate Point Lepreau NGS safely, and in accordance with regulatory requirements. NB Power's programs within the operating performance SCA meet CNSC staff expectations as NB Power has ensured the safety of workers, plant equipment, the public and the environment under normal conditions and accident conditions.

Details of the CNSC staff assessment in this SCA are presented in the following sections.

Conduct of licensed activity

CNSC staff confirmed that NB Power has implemented an Operating Policies and Principles (OP&Ps) document that establishes the operational activities at the Point Lepreau NGS. The OP&Ps state the operating boundaries within which the station may be operated safely and specify how NB Power will operate, maintain, and modify station systems while controlling risk to the public.

Periodic Safety Review

In accordance with [REGDOC-2.3.3](#), NB Power submitted a high-level project execution plan and a PSR Basis Document covering a 10-year period from 2022 to 2032. The PSR Basis [33], which was reviewed and accepted by CNSC staff [34] evaluated Point Lepreau NGS against modern codes, standards and identified the factors that may limit safe, long-term operation. The results of the evaluation were used to develop the 15 safety factors reports which covered important aspects to continued safe operation of the Point Lepreau NGS.

NB Power submitted all safety factor reports to CNSC staff in two submissions, one in December 2018 [35] and the other in March 2019 [36]. CNSC staff completed the review of all safety factor reports and requested NB Power to include and address all gaps identified in the Global Assessment Report (GAR).

The GAR provided an overall rating of the safety of Point Lepreau NGS and identified corrective actions, and safety enhancements. NB Power submitted the GAR in February 2020 [37], and NB Power developed an Integrated Implementation Plan (IIP) based on the GAR. The IIP includes major safety improvements for enhancing plant reliability and continued safe operation. NB Power submitted the IIP actions [38][39] and subsequent revisions of the IIP actions in April 2021 [6][40][41] and June 2021 [42] respectively. In June 2021, CNSC staff accepted the revised IIP actions submitted as it adequately addressed CNSC staff comments on Revision 1 of the IIP actions [7].

The submission provided sufficient clarification and this will be reflected in the next revision of the IIP actions planned for the spring of 2022 [7][41][42]. These changes are editorial in nature and therefore CNSC staff determine that they pose

no risk to the achievement of regulatory objectives of the PSR and licensing renewal of the Point Lepreau NGS.

The accepted IIP included 41 aggregate findings with a total of 385 individual IIP actions covering 9 safety and control areas. Table 4 gives details of the breakdown of the IIP actions completed and in progress as of June 30, 2021.

Table 4: Overview of aggregate findings for applicable SCAs

SCAs	Number of aggregate findings	Number of IIP actions	Number of IIP actions completed	Number of IIP actions in progress	Last date of completion of IIP actions
Management Systems	10	65	53	12	March 31, 2031
Human Performance management	5	17	15	2	June 30, 2022
Operating Performance	2	7	4	3	June 30, 2028
Safety Analysis	5	23	12	11	December 15, 2026
Physical Design	4	192	166	26	June 30, 2031
Fitness Service	6	57	40	17	June 30, 2030
Radiation protection	4	13	7	6	March 31, 2029
Environmental protection	3	6	1	5	June 30, 2023
Emergency Management	2	5	2	3	June 30, 2023
	41	385	300	85	

To ensure continuous safety improvements are made to Point Lepreau NGS, NB Power is required to complete additional PSRs prior to the end of each validity period of 10 years.

CNSC staff have determined that NB Power submissions related to the Point Lepreau NGS PSR identified no major concerns. The overall safety case for Point Lepreau NGS meets modern requirements based on CNSC staff assessments of the PSR Basis Document, safety factor reports, GAR and IIP actions.

CNSC staff conducted inspections and assessments of NB Power's activities to verify compliance with the OP&Ps and have determined that NB Power met regulatory requirements.

Unplanned transients

CNSC staff evaluate unplanned transients, including their causes and consequences as unplanned power reductions may indicate problems with plant

equipment and can place strain on the plant process systems during the transient. Unplanned transients include setbacks, stepbacks and automatic reactor trips that result in a reactor shutdown. These unplanned transients are monitored by CNSC staff to ensure NB Power adheres to their operating processes including the OP&Ps.

Table 5 provides a list of the number of unplanned transients from January 1, 2017 to March 31, 2021 (references [43] to [74]).

Table 5: Number of unplanned transients from 2017 to 2021

	2017	2018	2019	2020	2021*
Unplanned Reactor Trips	1	0	1	0	2
Stepbacks	0	0	0	0	0
Setbacks	1	0	0	0	0
Total	2	0	1	0	2

* Numbers reported are gathered up to a cut-off date of March 31, 2021.

During the current licensing period, CNSC staff reviewed all reactor transients at Point Lepreau NGS and conclude that NB Power followed approved operating procedures, investigated, or evaluated the root causes of the events and took appropriate corrective actions. Although unplanned transients place a burden on the plant and its operating staff, none of the unplanned transients represented a nuclear safety concern.

Procedures

Procedures are essential for safe execution of authorized activities. Procedures ensure that tasks are carried out in an approved, predictable, and safe manner to protect the workers, the station, and the environment.

CNSC staff continually assess NB Power procedures for all licensed activities. Oversight, in this specific area, focuses on ensuring that the licensee has an adequate process for the development, verification, validation, implementation, modification and use of procedures. These oversight activities take into account human performance considerations that demonstrate mechanisms exist for ensuring and improving procedural adherence, where necessary.

In 2021, CNSC staff conducted a Type II compliance inspection and identified numerous inconsistencies within the fire response program documentation. The safety significance of the findings was low. CNSC is currently reviewing NB Power's proposed corrective actions.

CNSC staff determined that NB Power meets regulatory requirements in this specific area.

Reporting and trending

During the current licensing period, NB Power continued to submit reports for the Point Lepreau NGS in accordance with CNSC regulatory document [REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants](#).

Table 6 is a breakdown of events reported by NB Power during the current licensing period for the Point Lepreau NGS.

Table 6: Point Lepreau NGS reportable events

Year	2017	2018	2019	2020	2021
Events Reported	21	20	26	26	24

For all reportable events, CNSC staff confirm NB Power followed up with corrective actions and root cause analyses, when appropriate. For the current licensing period, no significant events were reported to the Commission via the Event Initial Reports (EIRs).

For all scheduled reporting, NB Power sent satisfactory reports to CNSC staff within the required frequency as per [REGDOC-3.1.1](#).

NB Power regularly updates the Commission on their licensed activities during the status updates on power reactors and annually with the Regulatory Oversight Report for Canadian Nuclear Generating Sites.

CNSC staff did not identify any non-nuclear safety significant regulatory issues from NB Power's event and scheduled reports.

Outage management and performance

Outages are planned and undertaken by NB Power to conduct maintenance, testing and inspections that cannot be performed when the reactor is at power.

Over the current licensing period, CNSC staff verified that adequate provision had been established for reactor safety, heat sinks, radiation protection, and that all regulatory committed work had been performed safely and was completed. CNSC staff identified both compliant findings and non-compliant findings during the outage inspections. Notable outage findings are outlined below.

Due to the COVID-19 pandemic, CNSC staff replaced the Point Lepreau NGS 2020 planned Type II outage inspection [68] with field inspections on outage related activities [69]. During the current licensing period, NB Power undertook four unplanned outages to fix or replace equipment. These were communicated to the Commission via status reports on power reactors and through the annual Regulatory Oversight Report for Canadian Nuclear Generating Sites. CNSC staff confirmed NB Power conducted all appropriate follow-up actions for these outages.

Safe operating envelope

A Nuclear Power Plant (NPP) must be controlled in accordance with a set of operational safety requirements, supported by deterministic safety analysis, within

the boundaries of the Safe Operating Envelope (SOE). The SOE is the set of limits and conditions within which an NPP must be operated and which are monitored and controlled by the operator. The objective of the SOE is to ensure compliance with the deterministic safety analyses assumptions and results that form part of the licensing basis. NB Power's implementation of the SOE ensures that Point Lepreau NGS is always controlled and maintained in an analyzed state thereby ensuring adequate safety.

CNSC staff confirmed that NB Power implements and maintains a program for SOE in accordance with CSA N290.15, *Requirements for the safe operating envelope for nuclear power plants*. CNSC staff review any changes made to the licensee SOE and SOE methodology documentation to ensure they align with the expectations of CSA N290.15. In 2021, CNSC staff conducted SOE compliance activities to ensure that the SOE process meets regulatory requirements. The inspection identified ten (10) compliant findings [72].

CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Severe accident management and recovery

A severe accident management (SAM) program provides an additional layer of defence against the consequences of beyond design basis accidents (BDBAs) including severe accidents. Severe accident management guidelines (SAMG) ensure that personnel involved in managing a BDBA have the information, procedures, and resources necessary to carry out effective on-site actions.

CNSC staff confirmed that NB Power has implemented and continues to maintain the SAM program at Point Lepreau NGS in accordance with CNSC [REGDOC-2.3.2, Accident Management](#) and [REGDOC-2.10.1, Nuclear Emergency Preparedness and Response](#). See LCH Section 10.1, Emergency Preparedness and Fire Protection for more information on drills and exercises.

CNSC staff conclude that NB Power meets regulatory requirements in this area.

Accident management and recovery

CNSC staff confirmed that NB Power has implemented procedures that outline the necessary actions and response during abnormal incidents and design basis accidents. NB Power has implemented a series of Emergency Operating Procedures (EOPs) and Abnormal Plant Operating Procedures (APOPs) for Point Lepreau NGS. The purpose of these procedures is to mitigate abnormal situations in order to return the plant to a safe and controlled state, and to prevent the escalation of abnormal incidents into more serious accidents.

NB Power has improved the processes associated with the development, revision, and use of APOPs [75]. These updates included:

- enhancement of the procedural guidance to ensure it includes more details on how to write, format, verify, validate, revise, and issue EOPs
- enhancements to the validation of APOPs general actions

- enhancement to the procedural guidance provided for all APOP general actions
- enhancements to the conventions used in APOPs

CNSC staff routinely perform compliance verification activities to ensure that up to date EOPs and APOPs are available to the operators, should they be required and that operators are trained in their use.

In conjunction with CNSC [REGDOC-2.3.2, *Accident Management*](#), requirements are aligned and integrated with the Emergency Preparedness and Fire Protection SCA for drills and exercises in accordance with the requirements of [REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*](#).

CNSC staff are satisfied with NB Power's performance in this specific area.

3.3.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.3.3.1 Past Performance

CNSC staff have assessed NB Power's programs under the operating performance SCA at the Point Lepreau NGS. During the current licensing period, NB Power met the regulatory requirements for the operating performance.

3.3.3.2 Regulatory Focus

CNSC staff will continue to verify the NB Power performance and compliance in all aspects of the operating performance SCA, including all outage related activities, SOE limits and OP&Ps during the proposed licence period.

3.3.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] includes enhancement plans regarding the specific area of severe accident management.

NB Power is making progress toward developing accurate understanding of plant conditions during postulated accidents necessary for effective decision making and the use of the Severe Accident Management Guidelines (SAMGs).

A study by NB Power of the instrument and equipment survivability during severe accident conditions [76], showed that moderator level instrumentation could compromise the SAMG strategy for moderator makeup. Until the enhancement is complete, a compensatory measure is in place to use indirect measure from other sources (calandria vault level measurement and Reactor Building basement level measurement). Point Lepreau NGS initiated an upgrade to the moderator level instrumentation. The required date of completion of this IIP action is December 2027.

Based on the current program, these timelines in the IIP are acceptable to CNSC staff. CNSC staff will review submissions related to the implementation of this action and conduct on-site compliance verification activities.

3.3.4 Conclusion

NB Power continues to implement and maintain effective operations programs at the Point Lepreau NGS in accordance with regulatory requirements and has a clearly defined safe operating envelope. CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.4 Safety Analysis

The safety analysis SCA pertains to maintaining the safety analysis that supports the overall safety case for each 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.

This CMD covers the following specific areas of safety analysis:

- deterministic safety analysis
- probabilistic safety assessment
- hazards analysis
- criticality safety
- severe accident analysis
- management of safety issues (including R&D programs)

Licence condition 4.1 in the proposed PROL pertains to implementing and maintaining a safety analysis program. Compliance verification criteria are detailed in section 4 of the proposed LCH.

3.4.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the safety analysis SCA over the current licensing period:

SAFETY ANALYSIS			
Overall Compliance Ratings			
2017	2018	2019	2020
FS	FS	SA	SA
Comments			

NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's safety analysis meets regulatory requirements.

3.4.2 Discussion

The CNSC requires NB Power to conduct safety analyses for the Point Lepreau NGS to demonstrate that the design provides adequate prevention and mitigation measures to protect workers, public and environment in all plant states including postulated accidents, and to ensure the plant meets safety requirements.

CNSC staff performed compliance assessments of NB Power's safety analysis submissions during the current licensing period. CNSC staff did not observe any areas of non-compliance with the regulatory requirements. CNSC staff determined that NB Power has demonstrated improvements in the safety analysis SCA and continues to maintain a high level of safety.

Deterministic safety analysis

CNSC staff confirmed that NB Power performs deterministic safety analysis to evaluate the plant response to events in accordance with CNSC requirements [REGDOC-2.4.1, *Deterministic Safety Analysis*](#) published in 2014.

In February 2021, CNSC staff reviewed the most recent revision of the Point Lepreau NGS [REGDOC-2.4.1](#) implementation plan and determined that it is acceptable [77].

As part of NB Power's [REGDOC-2.4.1](#) implementation plan, and to demonstrate that safety margins remain appropriate considering important aging effects, NB Power submitted trip coverage safety analyses for the four following classes of accidents:

- Small Loss of Coolant Accidents (SLOCA) in 2018
- Loss of Reactivity Control accidents (LORC) in 2018
- Loss of Flow (LOF) due to partial or total loss of Class IV power in 2019
- Boiler Feedwater System Failure in 2020

These trip coverage analyses used limiting reactor conditions, with consideration to the projected conditions at mid-life and end-of-life to account for the aging impacts. Overall, CNSC staff were satisfied with the methodology, implementation and results of the analysis [78][79][80]. CNSC staff conclude that the assessments were consistent with the regulatory requirements in the LCH [14], [REGDOC-2.4.1](#) and CSA N286.7, *Quality Assurance of Analytical, Scientific, and Design Computer Programs* where applicable.

In 2020, CNSC staff reviewed NB Power submission for the trending of the aging parameters and confirmed that the key aging parameters used in safety analysis were consistent with requirements outlined in [REGDOC-2.4.1](#) [81]. One parameter of interest, which is the reactor inlet header temperature, was identified to be higher than determined from previous trending data. NB Power has developed a plan to address this issue based on CNSC staff Action Item 171202-

9319 [82] with a commitment date of completion on or before June 2023. [83][84].

CNSC staff confirmed that NB Power has made significant progress in the implementation of safety analysis that meets the requirements of [REGDOC-2.4.1](#). These include activities related to updating current safety analyses [85]. CNSC staff continue to monitor NB Power's implementation of [REGDOC-2.4.1](#) for new analysis.

NB Power continues to develop a methodology to address the Large Break Loss of Coolant Accident (LBLOCA) CANDU Safety Issues (CSIs), which industry termed the Composite Analytical Approach (CAA). Through an industry-wide agreement, Bruce Power is taking the lead in the development and implementation of probabilistic analysis techniques for break frequency of large diameter heat transport piping. CNSC staff notes that Bruce Power's request to re-categorize the 3 LBLOCA CSIs (AA9, PF9 and PF10) from Category 3 to Category 2 was approved. However, OPG and NB Power have not yet requested this re-categorization.

CNSC staff confirmed that NB Power issued a Safety Report update to the CNSC in June 2021, that meets regulatory requirements.

CNSC staff determined that NB Power's current safety analysis meets regulatory requirements and demonstrates that the Point Lepreau NGS has sufficient safety margins. The implementation of [REGDOC-2.4.1](#) is an enhancement to the existing safety analysis.

Probabilistic safety assessment

Probabilistic safety assessment (PSA) provides a comprehensive, structured approach to identifying accident scenarios and deriving numerical estimates of associated risks. The main benefit of PSA is to provide insights into plant design and operation, including the identification of dominant risk contributors and safety improvement opportunities, and the comparison of options for reducing risk. PSA is used in a complementary manner to the traditional deterministic safety analysis and defence-in-depth considerations.

CNSC staff confirmed that NB Power has a PSA Program at the Point Lepreau NGS that establishes a framework for the development and use of PSA to manage risk and contribute to safe operation of the facility.

In 2018, CNSC staff reviewed NB Power's updated PSA methodologies for compliance with [REGDOC-2.4.2, *Probabilistic Safety Assessment \(PSA\) for Nuclear Power Plants*](#). CNSC staff concluded that the updated Point-Lepreau NGS PSA methodologies were acceptable and meets regulatory requirements.

CNSC staff confirmed that NB Power submitted PSA update in 2020, which included updates to PSA Level 1 and 2 internal events at power and outage conditions. In 2021, NB Power submitted the Point Lepreau NGS Level 1, Level-2 seismic, Level 1 and Level 2 Flood and Level 1 and Level 2 Fire PSAs updates to the CNSC. The submission of PSA update follows regulatory requirements of [REGDOC-2.4.2](#) section 4.4, and [REGDOC-3.1.1](#) section 4.2 which is to update

the PSA analysis every five years or when requested by CNSC. CNSC staff review is in progress with the scope of verifying that NB Power's PSA analysis continues to comply with regulatory requirements of [REGDOC-2.4.2](#) and accepted PSA methodologies.

For the past five years of operation, All PSA results for core damage frequency and large release frequency were below the safety goals. CNSC staff determined that NB Power's performance met the requirements for PSA, and its update is consistent with section 4.1 of Point Lepreau NGS LCH [14].

Hazard analysis

CNSC staff confirmed that NB Power has a hazard analysis program that ensures SSCs credited to respond to accident conditions are qualified to survive and can function as required during the event. The analysis also demonstrates the ability of the design to effectively respond to common-cause events by confirming that the NPP design incorporates sufficient diversity and physical separation to cope with these events.

CNSC staff confirmed that the NB Power hazard screening was updated in 2016 including additional analyses performed on seismic, high wind and tsunami hazards [1][86]. For Point-Lepreau NGS, hazard analysis is conducted as an initial step to probabilistic safety assessments. This involves the assessment and screening of various types of hazards: internal and external hazards, naturally occurring and human-induced, but non-malevolent. Based on the hazard screening process, PSAs are developed for internal events, internal floods, internal fires, and seismic events [87].

CNSC staff conclude that NB Power meets the regulatory requirements in this area.

Criticality safety

CNSC staff confirmed that NB Power has only natural and depleted uranium on-site, which cannot become critical in air or light water due to the low fissile content. As such, there are no criticality safety concerns for fresh or spent nuclear fuel outside of the reactor core.

Severe accident analysis

Severe accidents represent the set of accidents that involve significant fuel degradation, either in core or in fuel storage.

The analysis provides insights into the challenges to the plant presented by severe accidents and ensures that prevention and mitigation measures are identified. These measures are used by NB Power to identify equipment that can be included in the SAMGs.

At the end of 2019, NB Power submitted severe accident analyses utilizing version 5.00 of the MAAP-CANDU code. The severe accidents analyses were performed in support of Level 2 PSA and included identifying the accident sequence and model, determining the release categories, and assessing compliance with the PSA safety goals according to [REGDOC-2.4.2](#).

NB Power performed analysis using the MAAP4-CANDU code in accordance with CSA standard N286.7 *Quality Assurance of Analytical, Scientific and Design Computer Programs for Nuclear Power Plants*. CNSC staff reviews of the submitted analyses are ongoing.

CNSC staff conclude that NB Power meets the regulatory requirements in this specific area.

Management of safety issues (including R&D programs)

CNSC staff continue to undertake systematic evaluations of NB Power's research and development (R&D) activities, as submitted to CNSC staff through annual reporting in accordance with clause 3.6 of [REGDOC-3.1.1](#). These evaluations confirm that NB Power maintains a robust R&D capability to identify and address any emerging issues.

There are currently three Category 3 CANDU Safety Issues (CSI) that are still open for NB Power. They are all related to a Large Loss of Coolant Accident (LLOCA) and are as follows:

- AA9 - analysis for void reactivity coefficient
- PF9 - fuel behaviour in high temperature transients
- PF10 - fuel behaviour in power pulse transients

NB Power, together with other Canadian utilities, indicated that the reclassification of the three remaining Category 3 CANDU Safety Issues (CSI) for Point Lepreau NGS will be resolved with the Composite Analytical Approach (CAA) methodology. CNSC staff will review the use of CAA for LLOCA analysis at Point Lepreau NGS once the analysis is submitted. The pilot use of the CAA methodology is being performed by Bruce Power.

In August 2018, CNSC staff received submissions [88][89] and a request from NB Power to reclassify CSI IH6, which deals with a need for systematic assessment of high energy line (HEL) break, from category 3 to 2. Based on the review of the submissions, CNSC staff determined that the layout/location of the HELs and Safety Critical Targets (SCTs) satisfies the separation philosophy in order to minimize the consequential damage associated with the postulated failure of the HELs inside the Point Lepreau NGS reactor building. Hence, CNSC staff conclude that NB Power's request to reclassify CSI IH6 to category 2 is acceptable.

CNSC staff have assessed NB Power's status update for the AA3 Computer Code and Plant Model Validation program and confirmed that CNSC staff comments on the code validation and accuracy estimation guidelines have been addressed and implemented in the revised versions of both guidelines and no further actions are required [90].

The systematic application of the Risk Informed Decision Making process for the identification of a path forward and resolution of the remaining CSIs, along with on-going regulatory research and taking operation experience into account are key aspects of the overarching safety principle of continuous safety improvement.

CNSC staff conclude that NB Power meets the regulatory requirements in this specific area.

3.4.3 Summary

A summary of past performance, regulatory focus and proposed improvements are presented in the following subsections.

3.4.3.1 Past Performance

CNSC staff determined that NB Power's past performance has been satisfactory. CNSC staff confirm that progress has been made in all areas within the safety analysis SCA and submitted updated deterministic safety analysis and probabilistic safety assessment. CNSC staff conclude that the Point Lepreau NGS met regulatory requirements in this safety and control area during the current licensing period.

3.4.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the safety analysis SCA, including the implementation of CNSC regulatory document [REGDOC-2.4.1, *Deterministic Safety Analysis*](#) to new analysis, to the extent practicable.

3.4.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP submitted on April 30, 2021 [6] includes enhancement plans regarding the following specific areas of the safety analysis SCA: deterministic safety analysis, probabilistic safety assessment hazards analysis, severe accident analysis, management of safety issues.

NB Power has assessed and identified [REGDOC-2.4.1](#) implementation gaps for analysis credited in safety analysis. NB Power's action to address the gaps includes a requirement for NB Power safety analysts and contractors to review the relevant event-specific gap assessment to ensure that the scope of planned safety analysis will address all significant gaps. Point Lepreau NGS provides the CNSC with periodic correspondence that includes an attachment that specifically identifies each gap, its score under a graded approach, how that gap has been addressed in the analysis or, if the gap remains, and provides a rationale why that the gap is acceptable. NB Power continues to update the [REGDOC-2.4.1](#) implementation plan and identify opportunities for improvement of the safety analysis. The required date of completion of this IIP action is March 2024.

CNSC staff confirm that NB Power completed all committed IIP actions under the specific area of PSA. NB Power's submission included presentation of the use of modern safety analysis methodologies and identified internal and external hazards, to show that the risks are sufficiently low and well balanced for all postulated initiating events and operational states. All actions have since been completed, as per CNSC [REGDOC-2.4.2](#) requirements, ahead of the completion date for this IIP action, June 2022.

The timelines for completion of the IIP actions are acceptable to CNSC staff. CNSC staff will review all submissions related to the implementation of [REGDOC-2.4.1](#) and [REGDOC-2.4.2](#). CNSC staff will continue to conduct compliance verification activities to ensure the safety analysis processes and programs for Point Lepreau NGS confirm the effectiveness of preventive measures and strategies in reducing the effects of hazards.

3.4.4 Conclusion

NB Power continues to implement and maintain effective safety analysis programs at the Point Lepreau NGS in accordance with regulatory requirements and maintains margins in the safety case. CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.5 Physical Design

The physical design SCA relates to activities that assure the ability of Structures, Systems and Components (SSCs) to meet their design requirements.

This CMD covers the following specific areas of physical design:

- design governance
- site characterization
- facility design
- structure design
- system design
- component design

Licence conditions pertaining to design program (LC 5.1), pressure boundary program (LC 5.2) and equipment and structure qualification program (LC 5.3) are included in the proposed PROL. Compliance verification criteria are detailed in section 5 of the proposed LCH.

3.5.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the physical design SCA over the current licensing period:

PHYSICAL DESIGN			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA

Comments

NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's physical design program meets regulatory requirements.

3.5.2 Discussion

The CNSC requires NB Power to implement and maintain design programs in accordance with applicable codes and standards as set out in the LCH [14]. CNSC staff have verified NB Power's programs associated with the physical design SCA and conclude that NB Power meets regulatory requirements.

Details of CNSC staff assessment in this SCA are presented in the following sections.

Design governance

Environmental qualification

CNSC staff confirmed that NB Power has implemented an EQ program that ensures that all required SSCs, are capable of performing designated safety functions during and following a postulated harsh environment resulting from design basis accidents. The program has been implemented and maintained in accordance with CSA N290.13-18, *Environmental Qualification of Equipment for CANDU Nuclear Power Plants*, which is identified as the design governance document. This program is included as a licence condition in the proposed licence.

CNSC staff confirm that procedural controls are in place to ensure the EQ status of the equipment is maintained for the life of the plant [91]. CNSC staff note that NB Power is performing measurements within the reactor building [92] in order to ensure that equipment subjected to station in-service operating conditions during normal life, and identified as having a safety function during and following a DBA, will not fail as a result of a harsh environment produced by the accident.

Human factors in design

In 2019, CNSC staff conducted a desktop inspection on human factors in design to verify compliance to CSA N290.12-14, *Human Factors in Design for Nuclear Power Plants* [93]. The desktop inspection identified three non-compliant findings of low safety significance. CNSC staff identified the following:

- NB Power's criteria and documented process used for grading human factors engineering activities were incomplete.
- NB Power's human factors engineering requirements specified in engineering packages were incomplete.
- NB Power's human factors engineering evaluations of designs were not performed systematically in a way that demonstrated that the recommendations of the design reviewers were addressed.

In 2020, CNSC staff reviewed NB Power's corrective actions including procedural changes and conclude that NB Power had taken the necessary actions to address the three non-compliances [94].

CNSC staff conclude that NB Power meets regulatory requirements in this area.

Pressure boundary program

CNSC staff observed that NB Power's pressure boundary program is comprised of processes, and procedures. CNSC staff confirmed that the controls associated with the program ensure activities related to design, procurement, fabrication, installation, modification, repair, replacement, testing, examination, and inspection of pressure-retaining systems and components, are compliant with CSA N285.0-12, *General Requirements for Pressure Retaining Systems and Components in CANDU Nuclear Power Plants*.

CNSC staff observed that NB Power has in place a formal service agreement with the Technical Inspection Services Branch of New Brunswick Department of Public Safety (NBDPS), which is NB Power's Authorized Inspection Agency (AIA). CNSC staff have proposed that NB Power request NBDPS to implement a CSA N285.0 centered AIA Quality program, which replicates the ASME QAI-1 standard, but is more specifically applicable to CSA N285.0 activities at CANDU NPPs [95] [96].

CNSC staff confirmed that NB Power is currently compliant with CSA N285.0-12, after NB Power completed gap analysis and identified no gaps for the implementation of the 2017 version of CSA N285. CNSC staff have added the 2017 version of CSA N285.0 as a requirement in the proposed LCH. CNSC staff will verify the implementation of CSA N285.0-17 through the future compliance verification activities.

CNSC staff conclude that NB Power meets regulatory requirements in this area.

Site characterizations

Site characterization is the process for describing the distinguishing characteristics, qualities, physical features, and environment of the land upon which the Point Lepreau NGS is located. Site characterization information for the Point Lepreau NGS is contained within the Point Lepreau NGS Safety Report (SR).

Site specific hazard assessment

CNSC staff observed that the NB Power Site Response Analysis for Point Lepreau NGS was based to a degree on generic data from literature review and expert opinion. The results of the Foundation Input Response Spectra (FIRS) [97], which is based on Probabilistic Seismic Hazard assessment [98], and the Site Response Analysis, are used as an input data for the seismic PSA. CNSC staff identified that a limitation of the FIRS report is the use of regional data from southeastern Canada and northeastern United States to estimate one of the parameters (κ) and CNSC staff identified an opportunity for improvement of the hazard estimate. CNSC staff requested that NB Power conduct a Point

Lepreau NGS site specific investigation to confirm NB Power's expert opinion regarding the input data, values for the parameter of interest and the results obtained based on this data during the current relicensing period [99]. NB Power submitted their updated Level 1 seismic PSA report to CNSC staff in June 2021 [100]. CNSC staff review of this report is ongoing. The NB Power submission does not change the hazard assessment previously used in 2016, and presently there is no change in the hazard estimate of Point Lepreau NGS.

CNSC staff conclude that there is no evidence of any significant safety risk identified in this specific hazard assessment and NB Power meets regulatory requirements in this specific area.

Tsunami floods

CNSC staff note that the Point Lepreau NGS is located on the Point Lepreau peninsula in the Bay of Fundy, approximately 40 km southwest of Saint John, New Brunswick. The grade level for the plant proper is at an elevation of 13.7 m above Mean Sea Level (MSL), with a condenser cooling water (CCW) pump house at an elevation of 7.62 m above the MSL. The service water pump impellers are placed approximately 10.7 m below mean sea level.

CNSC staff confirmed that NB Power conducted a site-specific Probabilistic Tsunami Hazard Assessment (PTHA) in 2015 [101]. The modelling results indicate that none of the scenarios considered would produce water levels high enough to reach the site grade of 13.7 m above MSL, even for the scenarios modelled at the highest astronomical tide level of 4.0 m above MSL.

CNSC staff conclude that the 2015 assessment results are still valid for the Point Lepreau NGS site [102].

CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Structure design

CNSC staff observed that NB Power has implemented a design program that governs the adequacy of the structure design of the Point Lepreau NGS. CNSC staff requires NB power to ensure that changes to any aspects of the design remain within the licensing basis, unless a licence amendment is sought.

CNSC staff reviewed NB Power's design changes against established criteria to ensure that they conform to design requirements or introduce new hazards. CNSC staff conclude that NB Power meets the regulatory requirements for structure design.

CNSC staff conclude that the Point Lepreau NGS continues to meet Seismic Design Basis regulatory requirements.

System design

Electrical power system

CNSC staff confirmed that NB Power maintains an electrical power system as designed. CNSC staff confirmed that NB Power completed all outstanding documentation related to the cable aging management program.

In 2021, an action item remains open to track battery modified performance testing program [103]. NB Power submitted closure criteria and continues to progress in corrective actions [104].

CNSC staff conclude that there are no significant safety concerns in the specific area of Electrical Power Systems (EPS) at Point Lepreau NGS and the system meets regulatory requirements.

Instrumentation and control

CNSC staff confirmed that key instrumentation and control (I&C) systems, such as the Shutdown Systems and the Digital Control Computer has had good performance since the previous licence renewal. There was also no I&C related non-compliance finding in the inspections conducted over the current licensing period.

CNSC staff conclude that instrumentation and control meet regulatory requirements of CSA N290.14, *Qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants*.

CNSC staff noted that NB Power has carried out a code compliance review (CCR) of the Point Lepreau NGS facilities for compliance with CSA N293-07, *Fire Protection for CANDU Nuclear Power Plants* as well as with key standards referenced therein such as the *National Building Code of Canada*, *National Fire Code of Canada*, and associated National Fire Protection Association (NFPA) standards [105].

CNSC staff confirmed that the methodology and scope of the CCR is considered acceptable to demonstrate the facility, and fire protection structures, systems and components (SSC), meet the requirements of applicable codes and standards. CNSC staff determined that where there were deviations from the prescriptive requirements, these were adequately documented and dispositioned. CNSC staff noted that the dispositions of deviations from the codes of construction are consistent with those of other CANDU stations and accepted industry practices.

CNSC staff concluded NB Power's CCR is acceptable to demonstrate compliance with CSA N293-07, which requires that a CCR be performed for existing facilities [106].

CNSC staff performed technical assessments of NB Power's submission of Third Party Reviews (TPR) of proposed modifications with the potential to impact protection from fire as per the requirements of the current PROL [107]. CNSC staff concluded that the provided TPRs met regulatory requirements for modifications [108].

Seismic qualification

CNSC staff determined that Point Lepreau NGS does not have a formal Seismic Qualification Program or a Seismic Qualification governance document as

described by industry best practices and CSA N289.1-18, *General requirements for seismic design and qualification of CANDU nuclear power plants*. However, NB Power does have many elements of such a program in place. NB Power's seismic qualification program is not defined in design guides (group 2 systems); however, modifications are covered under NB Power's process documents. NB Power's challenge is to build on these elements and integrate them into a formal mechanism. CNSC staff confirm that there are no significant safety risks posed by the absence of a formal program since the elements of the program can be found within various processes.

NB Power is required to develop a seismic qualification governance document, bringing together existing elements for Point Lepreau NGS in accordance with CSA N289.1, by submitting an implementation plan by December 30, 2021.

CNSC staff will follow-up through compliance verification activities in this specific area.

Component design

Cables

NB Power governance document *IR-05000-0006, Integrated Aging Management Program* is used to ascertain the preservation of cables at the Point Lepreau NGS. CNSC staff note that NB Power is implementing at the Point Lepreau NGS an aging management program for cables using NB Power governance document *IR-05000-0006, Integrated Aging Management Program* in accordance with [REGDOC-2.6.3, Aging Management](#). CNSC staff have determined that NB Power has a cable preservation program that met regulatory requirements [109].

Fuel design

During the current licensing period, CNSC staff reviewed the Point Lepreau NGS Report on Fuel Monitoring and Inspection each year and verified that fuel performance was adequate and the plant maintained compliance with fuel operating limits.

In 2018, NB Power was requested to provide their strategy to address the elevated fuel defect rates at the Point Lepreau NGS, which had consistently trended above the expected rate of 1 defect per unit per year. NB Power clarified that the fuel defects were caused by foreign material introduced by outage work on the primary heat transport system in loop 2. NB Power has established a response strategy including increased fuel inspections and is working with a third party to address the root cause of the issue. CNSC staff are satisfied with the actions taken by NB Power and will continue to monitor the situation and update the Commission of any significant developments through the Regulatory Oversight Report for Canadian Nuclear Generating Sites. The Point Lepreau NGS fuel program has demonstrated that it is capable of ensuring fuel safety.

CNSC staff determined that NB Power's fuel design and inspection program for the Point Lepreau NGS meets regulatory requirements.

3.5.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.5.3.1 Past Performance

CNSC staff note that NB Power demonstrated the design basis of equipment essential to support safe and reliable plant operation has been maintained. In addition, NB Power continues to maintain the plant configuration in accordance with the design and licensing basis, and operation within its safe operating envelope. Overall, CNSC staff have determined NB Power's programs with respect to the physical design SCA continue to meet regulatory requirements.

3.5.3.2 Regulatory Focus

CNSC staff will continue to verify the NB Power performance and compliance in all aspects of the physical design SCA, including cable aging management, fuel design, seismic qualification, fire protection, instrumentation and control, electrical power system, site characterizations, pressure boundary, and environmental qualification.

3.5.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] includes enhancement plans regarding the following specific areas of the physical design SCA: design governance, structure design, system design and component design.

NB Power is upgrading airlock and containment sealing door components with EQ equipment, including air hoses, valves, and seals. A Technical Operability Evaluation was performed to ensure system reliability while these improvements are being completed. The required date of completion of this IIP action is June 2024.

NB Power has committed to establish and apply systematic approach to problem solving to review the Primary Heat Transport (PHT) system states and activities since refurbishment to identify potential causes of fuel defects, focusing on sources of foreign material ingress. It was clarified that foreign material was introduced into PHT Loop 2 prior to 2017. The improvement actions identified in the assessment were accepted by the Nuclear Safety Oversight Committee (NSOC) and will be tracked by NB Power. CNSC staff will conduct compliance verification activities associated with the improvement actions. The required date of completion of this IIP action is December 2026.

Based on the current program, these timelines in the IIP actions are acceptable to CNSC staff. CNSC staff will review all submissions related to the IIP actions through the conduct of compliance verification activities to ensure the processes and programs for Point Lepreau NGS will continue to maintain their design basis as new information arises over time.

3.5.4 Conclusion

NB Power continues to implement and maintain effective physical design program at the Point Lepreau NGS in accordance with regulatory requirements and maintains margins in the safety case. CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.6 Fitness for Service

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

This CMD covers the following specific areas of fitness for service:

- equipment fitness for service / equipment performance
- maintenance
- structural integrity
- aging management
- chemistry control
- periodic inspections and testing, including Balance of Plant (BOP).

Licence condition 6.1 of the proposed PROL pertains to implementation and maintenance of a fitness for service program. Compliance verification criteria are detailed in section 6 of the proposed LCH.

3.6.1 Trends

The following table indicates the overall annual safety performance SCA ratings and trends for fitness for service over the current licensing period:

FITNESS FOR SERVICE			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. NB Power continues to maintain adequate programs to ensure the fitness for service of the SSCs important to safety, and of other safety related SSCs. Overall, CNSC staff			

conclude NB Power's fitness for service program meets regulatory requirements.

3.6.2 Discussion

CNSC staff confirmed that NB Power has processes and procedures in place to meet performance objectives and regulatory requirements pertaining to fitness for service.

Details of CNSC staff assessment in this SCA are presented in the following sections.

Equipment fitness for service/equipment performance

CNSC staff have verified that NB Power has procedures in place to monitor the fitness for service of equipment to support the continued safe operation. This is achieved by NB Power via the condition monitoring and operational assessments of inspection results and unit condition following each inspection, as well as verification by CNSC staff. In 2021, CNSC conducted an inspection of the Spent Fuel Bay (SFB) and had nine (9) compliant findings. CNSC staff verified that the SFB is maintained in a manner consistent with CNSC regulatory requirements and expectations [110].

During field inspections CNSC staff raised concerns of low safety significance regarding use of adhesive tape in the Reactor Building [19]. NB Power has initiated corrective actions.

Maintenance

CNSC staff confirm that NB Power has implemented well-developed policies, processes and procedures that provide direction and foundation for its maintenance program. CNSC staff determined that NB Power's maintenance program meets the requirements set out in [REGDOC-2.6.2, Maintenance Programs for Nuclear Power Plants](#).

CNSC staff conducted a maintenance work planning and scheduling inspection in 2021. The inspection identified several deficiencies in the maintenance work planning and scheduling process, such as a lack of adequate review of vendor procedures and the incompleteness of several work assessment walkdowns. An action item was opened to track NB Power's corrective actions to address these deficiencies [111]. The safety significance of these deficiencies was determined to be low since the safety functions of the relevant systems have not been affected. NB Power is in the process of implementing a corrective action plan to address all notices of non-compliance which will be submitted to CNSC staff by February 4, 2022.

CNSC staff reviewed NB Power's quarterly performance indicator reports and identified that the preventive maintenance completion ratio (PMCR) was better than the industry average during the current licensing period. Currently, the PMCR is at 90% [60]. This indicates that the preventive maintenance program is effective and minimizes the number of corrective maintenance activities.

CNSC staff confirm that NB Power maintained a very low level of critical corrective maintenance backlog and critical preventive maintenance deferrals. The critical deficient maintenance backlog continuously trended downwards but was still above the industry average. CNSC staff noted that the industry average also improved during the same period. CNSC staff determined that the safety-significance of the critical deficient maintenance backlog at Point Lepreau NGS is low since the safety functions of the associated components were maintained.

The critical corrective maintenance backlog, critical deficient maintenance backlog, and the number of critical preventive maintenance deferrals are provided in

Table 7.

Table 7: Maintenance backlogs and deferrals for critical components for Point Lepreau NGS 2017 to 2020

Parameter	Average quarterly work orders per unit in 2017	Average quarterly work orders per unit in 2018	Average quarterly work orders per unit in 2019	Average quarterly work orders per unit in 2020	Four years trending	Industry average in 2020
Corrective maintenance backlog	2	1	1	1	steady	1
Deficient maintenance backlog	71	27	15	17	down	4
Deferrals of preventive maintenance	1	0	1	1	steady	2

CNSC staff determined that NB Power's maintenance program meets regulatory requirements.

Structural integrity (including reliability)

CNSC staff confirmed that NB Power has established and implemented a Reliability Program according to [REGDOC-2.6.1, Reliability Programs for Nuclear Power Plants](#). A Reliability Program includes measures that confirm that systems important to safety are operated as per their design and at an acceptable level of reliability.

In accordance to [REGDOC-3.1.1](#), NB Power continues to submit Reliability Program reports to CNSC staff.

CNSC staff determined that for the past five years of operating performance, the systems important to safety (SIS) met their unavailability target for predicted future unavailability (PFU)[61][62], with the exception of containment isolation

PFU which was slightly above target, although efforts were made by NB Power to reduce the values. Containment exceeded its unavailability target of 1E-3 for two events: Containment at power was 1.22E-03 y/y (improved from 4.17E-03 y/y from 2019 ARR) and Containment shutdown 2.00E-03 y/y (improved from 5.28E-03 y/y from 2019 ARR). NB Power improved the containment PFU by their PFU reduction campaign. CNSC staff confirmed that NB Power put in place an action plan that includes the following two improvements:

- Procure and install cycle counters and opening time counters on each of the six airlock doors; this action is in progress to be implemented.
- Increasing the frequency of the Personnel Airlock Leakage test, and any associated maintenance, from quarterly to once every four weeks; this action is completed to CNSC staff satisfaction.

In August 2020, CNSC staff conducted a Type II inspection of the Reliability Program to assess its compliance with [REGDOC-2.6.1](#) [63].

CNSC staff determined that NB Power met regulatory requirements in this specific area.

Aging management

Managing the aging of a reactor facility means to ensure the availability of required safety functions throughout the facility's service life, with consideration given to changes that occur over time and with use. Both physical aging and obsolescence of SSCs that may, directly or indirectly, have an adverse effect on the safe operation of the reactor facility must be addressed.

Details of the CNSC staff assessment in this SCA are presented in the following sections.

CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

CNSC staff confirmed that NB Power has implemented an aging management program at Point Lepreau NGS according to CNSC [REGDOC-2.6.3, Aging Management](#).

In 2018, CNSC staff inspected the aging management program at Point Lepreau NGS to verify compliance with [REGDOC-2.6.3](#). CNSC staff identified eight non-compliances, including, discrepancies between the implementation of the aging management process and the governance documents. CNSC staff determined that the safety significance of the non-compliances was low. CNSC staff reviewed the corrective actions taken by NB Power and noted that the improvements clarified the process alignment with governance documents and the requirements of [REGDOC-2.6.3](#). CNSC staff concluded that NB Power's corrective actions in response to the inspection findings met regulatory requirements [112, 113].

CNSC staff monitor the implementation of the Point Lepreau NGS Integrated Aging Management Program through bi-annual updates. CNSC staff determined that lifecycle management plans for major components continued to meet regulatory requirements.

CNSC staff determined that NB Power meets regulatory requirements in this specific area.

Fuel channels

CNSC staff confirmed that NB Power has a fuel channel inspection program and continues to maintain fuel channel aging management plans.

CNSC staff noted that NB Power replaced all fuel channels during the refurbishment of the Point Lepreau NGS. CNSC staff identified that NB Power performed fuel channels inspections in 2014, 2016 and 2019 in accordance with CSA N285.4-09, *Periodic Inspection Of CANDU Nuclear Power Plant Components*. CNSC staff determined that NB Power's evaluations of the fuel channel inspection findings met regulatory requirements.

CNSC staff determined that NB Power meets regulatory requirements in this area.

Steam generators

CNSC staff confirm that NB Power inspected the steam generators during planned maintenance outage in 2016 and 2018 in accordance with CSA N285.4-09. The results of the 2016 and 2018 inspection and maintenance outages demonstrated that the condition monitoring assessment of Point Lepreau NGS steam generators is acceptable and no active degradation mechanisms will challenge the integrity of the steam generators before the next inspection outage. CNSC staff determined that NB Power's evaluation of the findings meet regulatory requirements.

CNSC staff determined that NB Power meets regulatory requirements in this specific area.

Feeders

CNSC staff notes that NB Power has an equipment program plan in place for the management of feeder degradations in accordance with CSA N285.4-09.

CNSC staff compliance and verification activities confirmed that NB Power inspected the feeders during the 2018 planned outage in accordance with CSA N285.4-09. The inspection results were reviewed by CNSC staff and found to meet the acceptance criteria.

CNSC staff confirmed that NB Power has revised the Integrated Asset Management Program which includes the requirement to support SSC specific Aging Management Plans. Aging management actions are being implemented under the station management system within a systematic Aging Management process, through the [REGDOC-2.6.3](#) Implementation Project [112].

CNSC staff determined that NB Power meets regulatory requirements in this specific area.

Reactor building structure

CNSC staff confirmed that NB Power has implemented an Integrated Aging Management Program for civil structures which defines the activities required to address aging related degradation.

During the current licensing period, CNSC staff performed compliance assessments of civil structure aging and did not identify any non-compliances.

CNSC staff noted that a CANDU Owners Group (COG) project determined that the Normac NR-5S 400 coating system should not be used for new submerged environments due to decreased adhesion and that existing applications where it is used should be inspected to evaluate the actual in service condition.

At the Point Lepreau NGS, the Normac coating system is used as a liner for the reactor building and for the dousing tank. The dousing tank liner is permanently submerged since the tank is maintained full of water. The reactor building basement liner could be submerged during an accident that results in dousing, for the duration of the containment mission time.

CNSC staff notes that NB Power performed a dousing tank liner inspection in 2020 and integrated the results into the Reactor Building Management Plan (RBMP). Images and videos were reviewed by NB Power personnel qualified as per Clause 5.3.1 of CSA N287.7-08. CNSC staff determined that the results indicate the liner is performing well and note that subsequent inspections by NB Power will continue using remotely operated vehicles and imaging equipment.

CNSC staff note that the qualification tests, which confirm the suitability of the Normac liner for its purpose, identify a life of 40 years [114]. CNSC staff have determined that since the Dousing Tank liner and reactor building basement liner were replaced during Refurbishment in 2012, the estimated service life for these liners is projected to end in 2052.

In 2017, CNSC staff accepted NB Power's proposal to change the frequency of the leak rate test of the reactor building from three to four years [115].

CNSC staff determined that there is no risk posed to safe operation of the reactor building structure and concluded that it continued to meet regulatory requirements.

Chemistry control

CNSC staff confirmed that NB Power has a chemistry control program as described in SI-01365-P94, *Controlling Station Chemistry* at the Point Lepreau NGS. The chemistry program establishes processes to ensure effective control of plant chemistry during operational and lay-up conditions.

CNSC staff confirmed that NB Power maintained good chemistry performance as demonstrated by the Chemistry Index and Chemistry Compliance Index performance indicators submitted to the CNSC on a quarterly basis in accordance with [REGDOC-3.1.1](#). CNSC staff review of the quarterly reports during the licensing period showed that NB Power demonstrated acceptable chemistry control.

CNSC staff conducted a Type II chemistry control inspection in September 2017. CNSC staff determined that NB Power was maintaining system chemistry control within the required parameters, however, non-compliances of low safety significance related to documentation were identified [116]. As a result, CNSC staff issued a notice of non compliance to NB Power to address an issue with several chemistry documents erroneously referencing related processes including an obsolete chemistry document. As a result of this finding, NB implemented corrective actions to revise their chemistry documentation [117]. CNSC staff conducted a follow-up inspection in November 2019 [118], and determined that the corrective actions were acceptable.

In January, 2020, CNSC staff identified that NB Power was operating outside of the defined SOE [119] from measurements taken in December, 2019, where the dousing tank had a hydrazine concentration (44 ppm), which was below the Unsafe Fault Limit of 50 ppm. The SOE document was revised by NB Power to remove this SOE limit, as chemistry is controlled using pH measurements and not hydrazine levels. CNSC staff analysis of chemistry data from the Point Lepreau NGS identified low pH levels in the dousing tank and requested NB Power to perform further safety analyses to confirm that the low pH limit values defined in the SOE document were acceptable. CNSC staff reviewed and accepted the analyses [120].

CNSC staff determined that NB Power meets regulatory requirements in this area.

Periodic inspection and testing

CNSC confirmed that NB Power has implemented periodic inspection programs for pressure boundary components, containment components and containment structures in accordance with the following CSA standards:

- CSA N285.4, *Periodic inspection of CANDU nuclear power plant components*
- CSA N285.5, *Periodic inspection of CANDU nuclear power plant containment components*
- CSA N287.7, *In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plants*

The periodic inspection programs are intended to confirm the low likelihood of a failure that could endanger the environment and the radiological health and safety of persons.

CNSC staff reviewed NB Power's submission of periodic inspection program documents and confirmed that regulatory requirements are met.

CNSC staff confirmed that NB Power complies with CSA N285.4-09 for the inspection of the primary heat transport and auxiliary systems, feeders, fuel channels and steam generators. CNSC staff continue to verify the programs associated with CSA N285.4. NB Power will implement the 2014 edition of the standard by June 2022 [121] for fuel channels and steam generators. In addition, NB Power will be implementing the 2019 edition of the standard by June 2022 for

general pressure boundary components and feeder pipes [122]. CNSC staff determined NB Power's implementation plan for both editions of CSA N285.4 is acceptable.

CNSC staff confirmed that NB Power complies with CSA N285.5-08 for the inspection of containment components. NB Power will be implementing the 2018 edition of the Standard by June 2022 [122].

CNSC staff identified that NB Power carries out inspections on non-nuclear pressure boundary components that have the potential to impact nuclear safety should they fail during operation. Findings from these activities are currently reported to CNSC staff in accordance with the reporting requirements of [REGDOC-3.1.1](#). NB power is in the process of developing a periodic inspection program for BOP pressure boundary components that will comply with CSA N285.7-21, *periodic inspection of CANDU nuclear power plant balance of plant systems and components*. Implementation of the program is targeted by NB Power for 2024.

CNSC staff confirm that the periodic inspection program has demonstrated that the likelihood of failure has not changed significantly since the plant was put into service.

Fuel channels

CNSC staff requested NB Power to augment the next fuel channels inspection campaign by at least two fuel channels as a consequence of ongoing presence of foreign material in the primary heat transport system [123]. NB Power committed to increase the scope of the fuel channels by two additional channels [124].

CNSC staff requested NB Power to submit a document change request along with a supporting safety case, as per section G.2 in the Point Lepreau NGS LCH [14], for removing the Level C transient (Loss of Pressure and Inventory Control During Warm-up) in order to continue to be in compliance with the requirements of CSA N285.8-15 for the renewed licensing period [125]. NB Power asserted that that transient event had never previously occurred and was not part of the original design and licensing basis but was added during refurbishment to align with the latest CANDU 6 design.

Balance of Plant

During the reporting period, CNSC staff did not identify significant compliance issues affecting safety in this area. CNSC staff continued to provide regulatory oversight in this area to verify that NB Power's inspection activities for safety-related balance of plant structures meet regulatory requirements.

CNSC staff determined that NB Power meets regulatory requirements in this specific area.

3.6.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.6.3.1 Past performance

CNSC staff compliance verification activities related to the fitness for service SCA identified areas for improvement. In such cases, CNSC staff confirmed that corrective actions for fitness for service non-compliances identified during the current licensing period were acceptable. CNSC staff have determined that NB Power continues to demonstrate satisfactory performance in the fitness for service SCA at the Point Lepreau NGS.

3.6.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the fitness for service SCA, including equipment fitness for service / equipment performance, maintenance, structural integrity, aging management, chemistry control and periodic inspections and testing including BOP.

3.6.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] include enhancement plans regarding the following specific areas of the fitness for service SCA: equipment fitness for service, maintenance, structural integrity, aging management, chemistry control, and periodic inspections and testing.

NB Power is developing a comprehensive Containment Penetrations Equipment Program Plan (EPP) which includes all penetrations, liners and strain gauges. The required date of completion of this IIP action is December 2023.

NB Power implementation plans are in progress at Point Lepreau NGS for CSA: N285.4-14, N285.5-13, N285.7-15, and N285.8-15. These plans are captured in the Point Lepreau NGS LCH and are acceptable to CNSC staff. The required date of completion of this IIP action is July 2024.

NB Power has incorporated the anticipated aging effects of the boilers into its *Equipment Protection Plan* specifically, *Steam Generator Management Plan*. The plan was accepted by CNSC staff and will mitigate the effects of aging and improve thermal performance. In accordance with the IIP, NB Power is required to complete all actions included in the Steam Generator Management Plan by December 2026.

NB Power is progressing with upgrades to the seismic monitoring system at the Point Lepreau NGS. To support these upgrades, NB Power governance document *Seismic Mass Vibration Monitoring System Technical Specifications*, will be reviewed to incorporate any updates to equipment seismic qualification from testing and will update the testing profiles to accurately reflect the seismic demand. Under NB Power's *Long Range Plan*, the required date of completion of this IIP action is December 2029.

Based on the current program, these timelines in the IIP actions are acceptable to CNSC staff. CNSC staff will review all submissions related to the implementation of these standards and monitor program implementation through the conduct of

compliance verification activities of the fitness for service processes and programs for Point Lepreau NGS.

3.6.4 Conclusion

NB Power continues to implement and maintain effective fitness for service program at the Point Lepreau NGS in accordance with regulatory requirements and major reactor components at Point Lepreau NGS remain fit for service. CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.7 Radiation Protection

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

The specific areas that comprise the radiation protection SCA include the following:

- application of ALARA
- worker dose control
- radiation protection program performance
- radiological hazard control

Licence condition 7.1 in the proposed PROL pertains to implementing and maintaining a radiation protection program and action levels. Compliance verification criteria are detailed in section 7 of the proposed LCH.

3.7.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the radiation protection SCA over the current licensing period:

RADIATION PROTECTION			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
NB Power has implemented and maintained an effective radiation protection program at Point Lepreau NGS, as required by the Radiation Protection Regulations . Over the current licensing period, no worker received a radiation			

dose in excess of regulatory dose limits as a result of the licensed activities conducted at Point Lepreau NGS.

NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude that NB Power's performance in the radiation protection program meets regulatory requirements.

3.7.2 Discussion

The [*Radiation Protection Regulations*](#) require licensees to implement a radiation protection (RP) program. As part of that program, licensees must keep effective and equivalent doses received by, and committed to, persons ALARA, taking into account social and economic factors. This is achieved through the implementation of management control over work practices, personnel qualification and training, control of occupational and public exposures to radiation, and planning for unusual situations. The [*Radiation Protection Regulations*](#) also prescribe dose limits for Nuclear Energy Workers (NEWs) and persons who are not NEWs.

CNSC staff confirmed that NB Power has implemented and continues to maintain an RP program that ensures contamination levels and radiation doses received by individuals are monitored, controlled, and maintained ALARA. CNSC staff conducted RP focused Type II inspections in 2017, 2019 and 2020, and RP field inspections were conducted annually. Details of the CNSC staff assessment in this SCA are presented in the following sections.

Application of ALARA

NB Power's commitment to the ALARA principle has been demonstrated through the implementation of the RP program at Point Lepreau NGS. The program includes the implementation of NB Power's program documentation, *Controlling Radiation Exposures As Low As Reasonably Achievable (ALARA)*. NB Power's program requires that all levels of the organization be involved in ensuring that ALARA is integrated into planning, scheduling, and work control. The program also requires the establishment and monitoring of ALARA performance targets for radiological work activities conducted at the site.

NB Power has an ALARA committee that provides oversight of the ALARA program. The ALARA committee meets monthly and is mainly responsible for the following activities:

- challenging and approving dose targets and dose reduction plans
- approving ALARA plans for work with an estimated total job dose of ≥ 10 person-mSv
- supporting the execution of the 5-year ALARA plan
- reviewing ALARA performance

At Point Lepreau NGS, ALARA plans are established for high hazard radiological work activities and are comprised of both worker dose control elements (e.g.

personal protective equipment, use of dosimetry, and back-outs) and dose optimization elements (e.g. time reduction and shielding).

In addition, NB Power has established a 5-year ALARA plan that provides strategic direction on how the Point Lepreau NGS's dose budget is defined, controlled, and applied, consistent with the ALARA principle. The 5-year ALARA plan is updated by NB Power at least every two years.

NB Power staff periodically monitor and track various ALARA performance metrics such as:

- collective radiation exposure (CRE)
- personal contamination events
- unplanned exposures

Table 8 illustrates the collective dose per operational state (routine operations versus outages) and the type of exposure (internal or external) from 2017 to 2020. The annual collective dose is the sum of all doses to all individuals at the facility over the period of one year. The variations in annual collective dose from year to year are due to the type and scope of work activities, noting that higher dose work activities are typically performed during maintenance outages. From 2017 to 2020, the internal dose varied from 13.2% to 26.2% of the total collective dose. The percentage of internal dose was the highest in 2019 in comparison to other years due to the 2019 planned maintenance outage resulting in many heavy water systems being opened for maintenance. The increase was expected, and although workers use personal protective equipment and respiratory protection as prescribed by procedures, the expected increase was mainly due to low chronic doses of tritium received by workers in the reactor building.

Table 8: Collective dose for Point Lepreau NGS, 2017 to 2020 (p-mSv)

Year	Routine operations	Outages	Internal	External	Total
2017	204	361	89	475	565
2018	217	963	156	1024	1180
2019	224	372	156	440	596
2020	211	1056	252	1015	1267

In 2018, inspection and cleaning of the primary side of the steam generator was undertaken, which explains the significant increase to the outage collective dose. This radiological work activity was not performed in 2017 or 2019 and the collective doses were accordingly lower in those years. In 2020, the collective dose was the highest because the planned outage included maintenance on the fueling machine bridge, shutdown cooling heat exchanger, and steam generator water lancing. Additional work on the primary side of one of the steam generators was also conducted during the 2020 outage. These radiological work activities,

along with other planned maintenance activities, resulted in a higher collective dose in 2020 than in previous years.

As part of CNSC staff regulatory oversight, a Type II inspection focusing on the ALARA program was conducted by CNSC staff in 2019 [126]. CNSC staff verified that NB Power uses ALARA initiatives; work planning; and dose monitoring and control, to work towards established ALARA targets. CNSC staff concluded that NB Power was compliant with CNSC regulatory requirements and ALARA initiatives were being effectively implemented.

CNSC staff are satisfied with NB Power's efforts in applying the ALARA principle to keep doses to workers ALARA over the current licensing period. CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Worker dose control

CNSC staff confirmed that the RP program implemented at Point Lepreau NGS is designed to ensure that doses to workers are controlled and do not exceed CNSC regulatory dose limits.

NB Power uses a combination of action levels; staff training and qualification; and dose management tools (e.g. administrative dose limits, allowable dose and work planning) to ensure radiation doses to workers are controlled, monitored and maintained ALARA. Engineered and administrative controls such as shielding and mandatory use of personal protective equipment are also established to ensure the protection of workers at Point Lepreau NGS.

NB Power operates a CNSC licensed dosimetry service to monitor, assess, record and report doses received by workers, visitors and contractors as a result of licensed activities at the Point Lepreau NGS. Doses received by NEWs are reported to the National Dose Registry. The available types of dosimetry, the criteria and procedures for use are implemented through the RP program.

All workers (including contractors) who perform radiation work are considered NEWs at Point Lepreau NGS. Radiation work is defined, amongst other factors, as all activities where the anticipated dose is expected to exceed 0.05 mSv per monitoring period (calendar month).

During the current licensing period, no radiation exposures reported at the Point Lepreau NGS exceeded a regulatory effective dose limit for a NEW and for a non-NEW. From 2017 to 2020, the maximum annual effective dose received by a NEW was 13.3 mSv (approximately 27% of the annual 50 mSv regulatory dose limit). This dose was received in 2018 by a NEW in the Fuel Handling work group. From 2017 to 2020, no measurable dose was assigned to a non-NEW.

As defined in the [Radiation Protection Regulations](#), the five-year dosimetry period is a fixed five-year period. The five-year dosimetry period that is applicable over this licensing period is the dosimetry period of 2016 to 2020. The maximum individual effective dose received by a NEW during this 5-year dosimetry period was 33.89 mSv (34% of the 100 mSv per 5-year regulatory dose limit).

Figure 2 presents the distribution of annual effective doses to all monitored workers at Point Lepreau NGS for the years 2017 – 2020. The workers monitored by NB Power include NEWs and non-NEWs. Figure 2 shows that, over the current licensing period, no radiation exposures received at Point Lepreau NGS exceeded the annual regulatory dose limit of 50 mSv for a NEW. In addition, approximately 85% of all monitored workers received radiation dose at or below 1.0 mSv.

Figure 2: Distribution of annual effective doses to all monitored workers at Point Lepreau NGS, 2017 – 2020

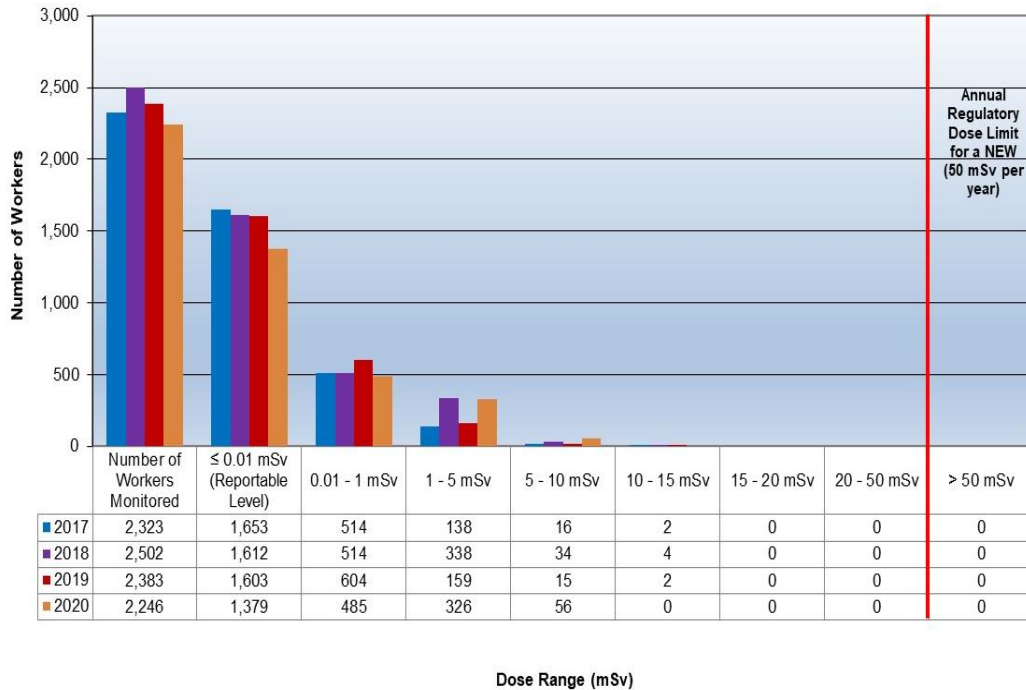


Figure 3 illustrates the non-zero average effective doses and the maximum individual effective doses received by a NEW from 2017 to 2020. Figure 3 shows that the annual non-zero average effective doses at Point Lepreau NGS ranged from 0.8 mSv to 1.5 mSv and the maximum individual effective dose received by a NEW at the Point Lepreau NGS site ranged from 9.6 mSv to 13.3 mSv.

The trend of effective doses received by NEWs over the current licensing period are reflective of the work activities at Point Lepreau NGS and are influenced by factors such as the type and scope of the radiological work activities. NEWs at Point Lepreau NGS are exposed to radiation during the completion of routine operations activities and maintenance when the reactor is operating, as well as activities carried out during planned and unplanned outages.

Figure 3: Average and maximum individual effective doses to NEWs at Point Lepreau NGS, 2017 – 2020

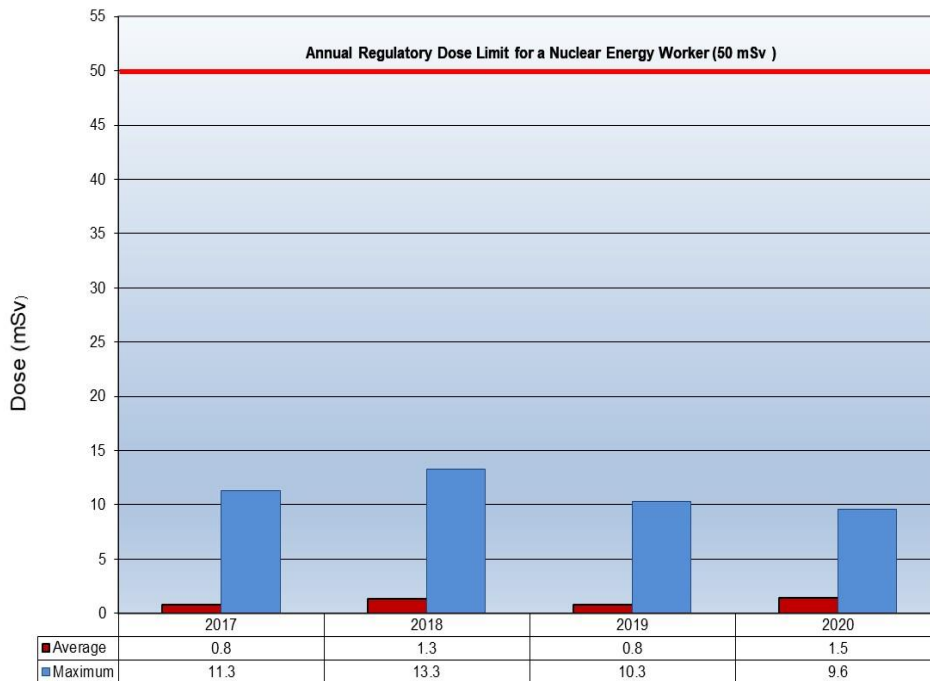


Table 9 provides the equivalent dose to the skin for NEWs at Point Lepreau NGS, during the current licensing period. The maximum annual equivalent dose to the skin that was received by a NEW at Point Lepreau NGS during the current licensing period was 27.7 mSv in 2019, (approximately 5% of the annual 500 mSv regulatory dose limit).

Table 9: Equivalent dose to the skin for NEWs at Point Lepreau NGS, 2017 – 2020

Dose statistic	2017	2018	2019	2020	Annual regulatory dose limit for a NEW
Average skin dose (mSv)	0.9	1.4	0.8	1.5	500 mSv/year
Maximum skin dose (mSv)	9.8	10.3	27.7	8.4	

Table 10 provides the equivalent dose to the extremities for NEWs at Point Lepreau NGS, during the current licensing period. The maximum annual equivalent dose to the extremities that was received by a NEW at Point Lepreau

NGS during the current licensing period was 13.6 mSv in 2020, (approximately 3% of the annual 500 mSv regulatory dose limit).

Table 10: Equivalent dose to the extremities for NEWs at Point Lepreau NGS, 2017 – 2020

Dose statistic	2017	2018	2019	2020	Annual regulatory dose limit for a NEW
Average extremity dose (mSv)	1.4	3.1	1.7	2.0	500 mSv/year
Maximum extremity dose (mSv)	5.3	11.7	8.2	13.6	

During the current licensing period, there were no action level exceedances for worker exposures.

In 2020, CNSC staff conducted an inspection focusing on worker dose control [127]. The inspection found that approximately 10% of the monitored workers did not provide bioassay samples as per the required schedule. While it is noted that internal exposure is a small percentage of the total dose to workers, not following the required schedule could affect the timely detection of intakes of radionuclides. An extent of condition was performed by NB Power and the internal dose received for the workers who submitted late bioassay samples was estimated as per their CNSC dosimetry licence. To address this non-compliance, NB Power provided a corrective action plan which includes the establishment of a sub-team committee. The purpose of this committee is to focus on obtaining cross-functional station input and support for ensuring that routine and non-routine bioassay samples are completed on time. In addition, several information technology improvements were proposed to improve worker's and supervisor's ability to monitor bioassay and Whole Body Counts (WBC) requirements to ensure that they are met. CNSC staff determined this finding (area for improvement) to be of low safety significance. CNSC staff will continue to monitor the implementation of NB Power's corrective actions through ongoing compliance verification activities.

CNSC staff are satisfied with NB Power's efforts over the current licensing period in controlling the effective and equivalent doses to workers at Point Lepreau NGS. CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Radiation protection program performance

RP program performance at Point Lepreau NGS was assessed during the current licensing period through various CNSC staff compliance verification activities, including technical assessment of quarterly reports. In addition to three focused RP Type II inspections at Point Lepreau NGS, several RP field inspections were

conducted annually. CNSC staff's assessment of NB Power's RP program performance through the RP field inspections identified areas of strength and opportunities for improvement. Opportunities for improvement were found in the area of radiological hazard posting. The posting of information on the radiological warning signs was not always performed according to the procedure. CNSC staff classified all findings from these inspections as low or negligible safety significance. NB Power implemented positive enhancements to the RP program and established appropriate corrective actions to address the areas requiring improvement. CNSC staff are satisfied with the corrective actions taken by NB Power.

In the quarterly reports submitted over the current licensing period, CNSC staff found that the reported information for the RP related safety performance indicators (SPIs) of Collective Radiation Exposure, Personnel Contamination Events (PCEs), Unplanned Dose/Unplanned Exposure and Loose Contamination Events met the regulatory requirements specified in [REGDOC-3.1.1](#), and no adverse trends were noted.

CNSC staff are satisfied with the performance of NB Power's RP program at Point Lepreau NGS over the current licensing period. CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Radiological hazard control

CNSC staff confirmed that NB Power's RP program ensures there are adequate measures in place to monitor and control radiological hazards. Methods of control include the use of radiation zone controls, surface contamination monitoring, and in-plant air monitoring and radiological dose rate surveys. Radiological hazards are either eliminated (if possible) or controlled with engineered barriers and signage identifying the level and extent of the hazards. Shielding is used to reduce exposures to workers during operational and maintenance activities.

The contamination control program at Point Lepreau NGS ensures contamination is prevented from being spread out of radiologically controlled areas, and the spread of contamination within these areas is minimized. Radiological zones/rubber areas are established according to their radiological hazard potential and with prescribed contamination levels. Access to radiologically controlled areas is restricted to authorized personnel. Radiologically controlled areas are posted with the required radiation warning signage, routine monitoring for contamination is performed, and monitoring of personnel and material prior to leaving contaminated or potentially contaminated areas is conducted as required. The exception was one instance where the room which houses two radioactive sources was not posted with the required radiation warning symbol and the words "RAYONNEMENT-DANGER-RADIATION". This was immediately remedied by NB Power and reported through the requirements of [REGDOC-3.1.1](#) [128, 129].

Radiological monitoring programs confirm the effectiveness of contamination control and include a combination of direct and indirect contamination monitoring of areas (lunchrooms, corridors and rooms), footwear, work clothing and personal

protective equipment. Airborne contamination monitoring, conducted in designated areas, provides timely notification of changing conditions. All these measures are in place to minimize the potential for intakes of radiation by workers. During the current licensing period, no adverse trends were reported by NB Power as a result of the radiological hazard surveys and there were no action level exceedances for contamination control.

As part of CNSC staff regulatory oversight, a Type II inspection focusing on radiological hazard control was conducted by CNSC staff in 2017 [129]. CNSC staff concluded that NB Power was compliant with regulatory requirements.

CNSC staff are satisfied with NB Power's efforts in monitoring and controlling the radiological hazards at Point Lepreau NGS over the current licensing period. CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

3.7.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.7.3.1 Past Performance

CNSC staff have assessed NB Power's programs under the radiation protection SCA at the Point Lepreau NGS. During the current licensing period, NB Power meets the regulatory requirements for the radiation protection SCA.

3.7.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the radiation protection SCA, including maintaining RP instruments and equipment, mitigating and controlling tritium, controlling contamination, verifying that the protection of workers is optimized, and that worker doses are kept ALARA.

3.7.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] includes enhancement plans regarding the following specific areas of the radiation protection SCA: application of ALARA, worker dose control and radiological hazard control.

NB Power is addressing the ALARA issues identified in their governance documents with the following activities included in the enhancement plans:

- addressing ALARA issues identified in governance documents related to the assessment of tritium dose reductions for the moderator system
- prevention of airborne tritium within some areas of the service building through the ALARA Five Year Plan
- removal of tritiated moderator water in 2028

The required completion date of the enhancement plans in RP is March 2029.

Based on the current RP program, this timeline is acceptable to CNSC staff. CNSC staff will review all submissions related to the implementation of these enhancements and will monitor progress through the conduct of compliance verification activities.

3.7.4 Conclusion

NB Power continues to implement and maintain effective radiation protection program at the Point Lepreau NGS that prevents dose limits exceedances in accordance with regulatory requirements. CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.8 Conventional Health and Safety

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

This CMD covers the following specific areas of conventional health and safety:

- performance
- practices
- awareness

Licence condition 8.1 in the proposed PROL pertains to implementing and maintaining a conventional health and safety program. Compliance verification criteria are detailed in section 8 of the proposed LCH.

3.8.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the conventional health and safety SCA over the current licensing period:

MANAGEMENT SYSTEM			
Overall Compliance Ratings			
2017	2018	2019	2020
FS	FS	SA	SA
Comment			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's conventional health and safety program meets regulatory requirements.			

3.8.2 Discussion

NB Power maintains a conventional health and safety program in accordance with regulatory requirements. CNSC staff verified that NB Power has an effective conventional health and safety program that fosters safe work practices and conditions to achieve a high level of personnel safety at the Point Lepreau NGS.

NB Power's occupational health and safety program complies with the [New Brunswick Occupational Health and Safety Act](#) and associated provincial statutes to minimize risk to health and safety of workers posed by conventional (non-radiological) hazards in the workplace. WorkSafeNB is the provincial authority mandated to oversee the act within the province of New Brunswick.

Performance

The accident severity rate (ASR), accident frequency (AF) and industrial safety accident rate (ISAR) are parameters reported by NPP licensees that measure the effectiveness of the conventional health and safety program with respect to worker safety. The ASR measures the total number of days lost due to injury for every 200,000 person-hours (approximately 100 person-years) worked at an NPP. The AF is a measure of the number of fatalities and injuries (lost-time and medically treated) due to accidents for every 200,000 person-hours worked at an NPP. The ISAR is a measure of the number of lost-time injuries for every 200,000 hours worked by NPP personnel.

Table 11 below shows the AF, ASR and ISAR for the Point Lepreau NGS from 2017 to 2021 (Quarter 1).

Table 11: Point Lepreau NGS accident frequency rate, accident severity rate and industrial safety accident rate

Year	Accident frequency rate	Accident severity rate	Industrial safety accident rate
2017	0.40	0.00	0.00
2018	0.30	3.4	0.10
2019	0.67	0.00	0.00
2020	0.51	0.34	0.08
2021 (Q1)	0.78	0	0

Table 12 below shows the number of lost days, number of fatalities, number of lost time injuries, and number of medically treated injuries for the Point Lepreau NGS from 2017 to 2021 (Quarter 1).

Table 12: Point Lepreau NGS number of lost days, fatalities, lost-time injuries, and medically treated injuries

Year	Number of lost days	Number of fatalities	Number of lost-time injuries	Number of medical treatment injuries
2017	0	0	0	3
2018	34	0	1	2
2019	0	0	0	8
2020	4	0	1	5
2021 (Q1)	0	0	0	2

Performance indicators for the conventional health and safety SCA are reported annually to the Commission as part of the CNSC staff *Regulatory Oversight Report for Canadian Nuclear Generating Sites*. Overall, CNSC staff are satisfied with NB Power's performance in this specific area.

Practice and Awareness

CNSC staff confirmed that NB Power has processes in place that emphasize safety and describes the occupational health and safety program.

Through field inspections, CNSC staff confirmed that the conventional health and safety work practices and conditions at the Point Lepreau NGS continued to achieve a high degree of personnel safety. There continues to be a safe and efficient working environment where situational awareness and safe work practices are encouraged.

During the current licensing period, NB Power's performance in the practice and awareness specific area met CNSC requirements.

CNSC staff conclude that NB Power protects workers from conventional occupational hazards.

3.8.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.8.3.1 Past Performance

NB Power continues to meet CNSC staff expectations and requirements pertaining to the conventional health and safety SCA.

3.8.3.2 Regulatory Focus

CNSC staff will continue to oversee NB Power's conventional health and safety processes and practices.

3.8.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] did not identify any plans regarding the conventional health and safety SCA. However, CNSC staff in consultation with WorkSafeNB continue to verify conventional health and safety performance at Point Lepreau NGS.

3.8.4 Conclusion

Based on CNSC staff assessments of NB Power's licence application and past performance, CNSC staff conclude that NB Power's conventional health and safety program continues to protect workers from conventional hazards and maintains an adequate licensing basis that meets regulatory requirements.

3.9 Environmental Protection

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

This CMD covers the following specific areas of environmental protection:

- effluent and emissions control (releases)
- environmental management system
- assessment and monitoring
- protection of people
- environmental risk assessment

Licence condition 9.1 in the proposed PROL pertains to implementing and maintaining an environmental protection program. Compliance verification criteria are detailed in section 9 of the proposed LCH.

3.9.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the environmental protection SCA over the current licensing period:

ENVIRONMENTAL PROTECTION			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude that the appropriate protective measures are in place to prevent unreasonable risk to the environment and to people, and that NB Power's environmental protection program meets regulatory requirements.			

3.9.2 Discussion

CNSC staff confirmed that NB Power implements and maintains an environmental protection program that meets regulatory requirements. NB Power engages in continuous improvement taking into consideration the results of monitoring activities, environmental risk assessments, standards and regulatory documents to ensure all environmental protection programs meet their design objectives for the protection of the environment and the health of persons.

CNSC staff confirmed that NB Power has an Environmental Monitoring Program (EMP) in place for the Point Lepreau NGS. The EMP has two subsets: a Radiation Environmental Monitoring Program (REMP) for radiological releases and a Non-Radiological Environmental Monitoring Program for hazardous substances.

The EMP includes policies, station instructions, methods and procedures to identify, control and monitor all releases of nuclear and hazardous substances from Point Lepreau NGS into the environment, and to protect the health and safety of people and the environment. NB Power's EMP results are summarized in annual reports available on the NB Power website:

<https://www.nbpower.com/en/safety/nuclear-safety/environmental-protection>.

NB Power became compliant with the following CSA Standards over the course of the current licencing period:

- CSA N288.4-10, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*
- CSA N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills*
- CSA N288.6-12, *Environmental Risk Assessments at Class I nuclear facilities and uranium mines and mills*
- CSA N288.1-14, *Guidelines for calculating DRLs for radioactive material in airborne and liquid effluents for normal operation for nuclear facilities*
- CSA N288.7-15, *Groundwater protection programs at Class I nuclear facilities and uranium mines and mills*

NB Power continues to update its environmental protection programs in accordance with CSA N288 standards that have been implemented (refer to bulleted list above) and is working towards implementation of CSA N288.2, *Guidelines for Calculating the Radiological Consequences to the Public of a Release of Airborne Radioactive Material for Nuclear Reactor Accidents*. These standards have been or are currently being integrated into NB Power's corporate Environmental Management System initiative. CNSC staff will continue to verify implementation of, and compliance with, these CSA standards.

During the proposed licensing period, CNSC staff will monitor the implementation of the [REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures, version 1.1](#). Another area of

focus will be on the anticipated implementation by NB Power of [REGDOC-2.9.2, Controlling Releases to the Environment](#), which sets out the CNSC's requirements and guidance for controlling releases to the environment through the following general topics covered by the REGDOC:

- applying the concept of best available technology and techniques, economically achievable (BATEA)
- establishing and implementing licensed release limits and action levels for releases to the environment
- commissioning a treatment system and confirming performance
- implementing adaptive management where required

The public consultation for [REGDOC-2.9.2](#) opened in March 2021 and closed in July 2021.

CNSC staff conduct compliance verification activities which include technical assessments of quarterly and annual scheduled compliance reports, event report reviews, and inspections (desktop, field, and Type II). There were no non-compliances from inspections related to the environmental protection SCA during the current licensing period.

CNSC staff conclude NB Power's environmental protection program currently in place for the Point Lepreau NGS complies with all applicable federal and provincial regulatory requirements and continues to protect the health and safety of people and the environment.

Details of CNSC staff assessment in this SCA are presented in the following sections. Additional information on CNSC staff assessment of the environmental protection SCA can be found [here](#) in the EPR report for the Point Lepreau NGS on the CNSC website.

Effluent and emissions control (releases)

CNSC staff confirmed that NB Power has implemented and maintains an effluent and emissions monitoring program at the Point Lepreau NGS as required by the [Class I Nuclear Facilities Regulations](#). To enhance its existing program, NB Power implemented the CSA N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills* on January 1, 2018.

Based on CNSC staff assessment of the results presented in NB Power's quarterly and annual reports, as well as compliance verification activities conducted during the licensing period, CNSC staff determined that radiological and non-radiological releases from Point Lepreau NGS remained below their respective regulatory limits and NB Power has met expectations in the area of effluent and emissions control (releases).

CNSC staff conclude that the effluent monitoring program currently in place for Point Lepreau NGS continues to provide adequate protection to the environment and meets regulatory requirements.

Radiological releases

The limits for radiological releases are known as the Derived Release Limits (DRLs). DRLs apply to the release point for each of the two effluent pathways for Point Lepreau NGS: the ventilation stack for airborne releases; and, for liquid releases, the discharge point of the Condenser Cooling Water into the Bay of Fundy.

In 2018, NB Power updated its DRLs at the Point Lepreau NGS in accordance with Update No. 3 of CSA N288.1-14, *Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal Operation of Nuclear Facilities* issued June 2018 [130]. CNSC staff reviewed and accepted the new DRLs which continue to provide adequate protection to the environment and to people from impacts of radionuclides. The new DRLs were implemented in 2019 [131].

Annual radionuclide releases to atmosphere and surface water of tritium, carbon-14, noble gases, iodine-131 and particulates from 2017 to 2020 are presented in Table 13 and Table 14, respectively:

Table 13: Point Lepreau NGS annual radionuclide releases to atmosphere for 2017 – 2020 and applicable DRLs for 2020

Year	Tritium: (HTO: Bq)	Carbon- 14 (Bq)	Noble Gases (Bq-MeV)	Iodine- 131 (Bq)	Particulate (Gross beta/gamma) (Bq)
2017	1.5 X 10 ¹⁴	3.1 X 10 ¹¹	4.6 X 10 ¹³	<5.2 X 10 ⁵	<2.2 X 10 ⁶
2018	1.4 X 10 ¹⁴	3.3 X 10 ¹¹	2.5 X 10 ¹³	1.3 X 10 ⁶	<2.2 X 10 ⁶
2019	2.5 X 10 ¹⁴	2.8 X 10 ¹¹	2.9 X 10 ¹³	2.7 X 10 ⁷	<2.2 X 10 ⁶
2020	2.9 X 10 ¹⁴	1.6 X 10 ¹¹	3.2 X 10 ¹³	7.1 X 10 ⁶	2.0 X 10 ⁶
2020 DRL	2.4 X 10¹⁷	1.2 X 10¹⁶	a	3.9 X 10¹³	a

a: Specific DRLs are calculated for a range of noble gas and particulate categories. None of these individual DRLs were exceeded.

Table 14: Point Lepreau NGS annual radionuclide releases to surface waters for 2017 – 2020 and applicable DRLs for 2020

Year	Tritium: (HTO: Bq)	Gross beta (Bq)	Carbon- 14 (Bq)	Gross Alpha (Bq)
2017	1.2 X 10 ¹⁴	7.8 X 10 ⁷	1.8 X 10 ⁹	7.9 X 10 ⁶
2018	2.4 X 10 ¹⁴	9.7 X 10 ⁷	4.9 X 10 ⁹	1.7 X 10 ⁷
2019	3.4 X 10 ¹⁴	8.4 X 10 ⁷	7.6 X 10 ⁹	1.3 X 10 ⁷
2020	4.6 X 10 ¹⁴	3.8 X 10 ⁷	1.0 X 10 ⁹	7.1 X 10 ⁶

Year	Tritium: (HTO: Bq)	Gross beta (Bq)	Carbon- 14 (Bq)	Gross Alpha (Bq)
2020 DRL	4.5×10^{19}	a	3.7×10^{14}	a

a: Specific DRLs are calculated for a range of noble gas and particulate categories. None of these individual DRLs were exceeded.

Data in Table 13 and Table 14 show that over the current licensing period, radiological releases continued to be well below their corresponding DRLs.

Non-radiological releases

The federal and the provincial (NB) governments have legislation in place for non-radiological releases. At the federal level, all relevant emissions are tracked at Point Lepreau NGS under the [Canadian Environmental Protection Act, 1999](#) (CEPA 1999) and reported under the National Pollutant Release Inventory (NPRI), the Federal and Provincial Greenhouse Gas Emission (GHG) databases, and via the Effluent Regulation Reporting Information System (ERRIS). All emissions were consistently below their reporting threshold between 2017 and 2020.

Under the New Brunswick *Clean Environment Act*, NB Power has an approval to operate a domestic wastewater treatment system (sewage) and an approval to operate the industrial wastewater treatment system at Point Lepreau NGS. NB Power is required to submit the wastewater compliance reports to the New Brunswick Department of Environment and Local Government (NBDELG). CNSC staff receive and review copies of these reports and found them to be acceptable.

As required by [REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants](#), NB Power submits the results of effluent and environmental monitoring to CNSC staff in quarterly Safety Performance Indicators (SPI) reports, and in Annual Compliance Reports (ACR) on environmental protection.

Between 2017 and 2020, values of parameters monitored in both domestic and industrial wastewater treatment systems at Point Lepreau NGS remained at levels that did not pose any unreasonable risk to the environment and to the health and safety of persons.

Environmental Management System (EMS)

CNSC staff confirmed that NB Power continues to implement and maintain an Environmental Management System (EMS) at Point Lepreau NGS in accordance with [REGDOC-2.9.1, Environmental Protection Policies, Programs and Procedures](#). NB Power's EMS is registered to ISO 14001: 2004 Standard, *Environmental Management Systems – Requirements with Guidance for Use*. While registration/certification to this standard is not required by the CNSC, it is one measure indicates recognition of NB Power's EMS by a third party.

The EMS identifies all activities and products that could impact the environment, develops environmental assessment and improvement programs for such activities

and products, and assesses environmental risks associated with these activities and products in a way that prevents or mitigates adverse environmental effects.

NB Power has indicated in its IIP actions that Point Lepreau NGS has developed a comprehensive strategy and implementation plan to mitigate the long-term hazards associated with handling, transfer, storage, and final disposal of spent resin. The plan considers that there is sufficient storage capacity in the in-station storage tanks to house spent resin until the end of station operations. Following the end of Point Lepreau NGS operation, the spent resin will be transferred to a radioactive waste volume reduction facility to be processed (10:1 volume reduction) then transferred to the Point Lepreau NGS SRWMF.

CNSC staff confirm that NB Power has maintained a comprehensive EMS at Point Lepreau NGS over the current licensing period that meets CNSC requirements.

Assessment and monitoring

NB Power is required to maintain an up-to-date Environmental Monitoring Program (EMP), in compliance with [REGDOC-2.9.1](#) and relevant standards, including CSA N288.4-10, *Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills*, and CSA N288.5-11, *Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills*. The environmental monitoring requirements of the EMP provide details about monitoring locations, frequencies, and environmental parameters to be measured. The data collected under the EMP are compared with predictions in NB Power's Environmental Risk Assessment (ERA) to confirm that there is minimal risk to the environment and human health from Point Lepreau NGS.

Based on monitoring results from 2017 to 2020, CNSC staff concluded that the operation of Point Lepreau NGS had no adverse impact on the environment and the public. Additional information is provided in the EPR Report.

Ambient air monitoring

Radiological air monitoring

The Gaseous Effluent Monitor (GEM) continuously monitors air released from the stack at Point Lepreau NGS for airborne radionuclides as noted under the effluent and emissions control (releases) specific area. In addition to the release stack, CNSC staff confirmed that NB Power continuously monitors ambient air from specified locations around Point Lepreau NGS and in the nearby communities. Air releases are monitored for airborne particulates (gross alpha and gross beta), noble gases, radio-iodines, tritium and carbon-14.

CNSC staff confirmed that NB Power also monitors ambient gamma radiation at several locations near its SRWMF and compares these results to the reference location at St. Andrews. Based on Thermoluminescent Dosimeter (TLD) measurements, ambient gamma radiation is slightly lower offsite compared with onsite due to the proximity of SRWMF and reactor building as the slightly elevated measurements are at the locations near the SRWMF and reactor building. However, the measurements at onsite locations are not significantly different from

those at offsite locations, and no adverse effects to relevant human receptors are expected.

Non-radiological air monitoring

As part of its Non-Radiological EMP, NB Power monitors ambient air for non-radiological airborne releases to the environment. The main sources for non-radiological contaminants in air at Point Lepreau NGS include light fuel oil consumption, diesel fuel oil combustion, and the ventilation stack located on the reactor building. These emission sources have the potential to emit carbon monoxide (CO), carbon dioxide (CO₂), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), volatile organic compounds (VOCs), and particulate matter (PM). Table 15 provides the annual non-radiological releases to the atmosphere, in tonnes, between 2017 and 2020, compared against the GHG and NPRI reporting thresholds.

Table 15: Annual non-radiological air emissions from Point Lepreau NGS (2017 – 2020) in tonnes per year

Parameter	CO	CO ₂	NO ₂	SO ₂	VOCs	PM
Reporting threshold	20^(a)	10 000^(b)	20^(a)	20^(a)	10^(a)	20^(a)
2017	N/A ^(c)	1146	3.10	0.02	N/A ^(c)	0.16
2018	0.757	3734	10.09	0.02	0.030	0.53
2019	0.525	2590	7.00	0.01	0.020	0.37
2020	0.171	848	0.007	0.003	0.007	0.12

(a) NPRI reporting threshold

(b) GHG reporting threshold

(c) Data not available

As shown in Table 15, all non-radiological airborne releases from Point Lepreau NGS have been below the reportable limits for NPRI and GHG emissions from 2017 to 2020.

Water monitoring

Based on the information provided in the following subsections, CNSC staff conclude that the level of waterborne radionuclides is acceptable and does not pose a risk to the environment and the public. CNSC staff also conclude that the water monitoring data demonstrates that the current Point Lepreau NGS operations have no adverse effects to relevant human and environmental receptors.

Surface water, pond, and puddle monitoring

CNSC staff confirmed that NB Power uses the Liquid Effluent Monitor (LEM) to collect samples of Point Lepreau NGS liquid releases containing radionuclides at their source, with results presented in Table 16 under the effluent and emissions releases (control) specific area. In addition, NB Power collects water samples

from ponds, lakes, streams, and runoff. During the current licensing period, tritium was detected in some of the samples analyzed, ranging from 14 to 280 Bq·L⁻¹. The tritium detected was below reporting thresholds with no adverse impacts to the environment and the public. No gamma emitters were detected in these samples.

Well water monitoring

CNSC staff confirmed that NB Power collects well water samples semi-annually from 16 locations around the Point Lepreau NGS. During the current licensing period, detected tritium concentrations in well water ranged from 11 to 100 Bq·L⁻¹, which is well below the 7000 Bq·L⁻¹ limit recommended by the Health Canada, 2010 *Guidelines for Canadian Drinking Water Quality*.

Precipitation monitoring

CNSC staff confirmed that NB Power also monitors precipitation. The radionuclide frequently detected in precipitation is tritium. From 2017 to 2020, detected tritium levels in precipitation spanned from 11 to 2400 Bq·L⁻¹. The concentration of carbon-14 in precipitation was below the detection limit; this is expected as carbon-14 releases from Point Lepreau NGS were low during the same period.

Water monitoring around the SRWMF

CNSC staff confirmed that NB Power monitors bore hole water and parshall flumes around the SRWMF for radionuclides. Each year, NB Power analyzes over 250 samples in total [132]. During the current licensing period, tritium was detected in over two-thirds of the samples analyzed. Cosmogenically produced Be-7 (beryllium) and naturally occurring K-40 (potassium) were detected in 9 and 7 samples, respectively. Co-60 (cobalt) was detected in one of the samples in 2020 only, and at a level slightly above the detection limit. NB Power has attributed tritium and Co-60 results to the releases from Point Lepreau NGS and the material stored in the SRWMF Phase 1 structures.

Other water monitoring

CNSC staff confirmed that NB Power collects seawater samples quarterly from three locations close to Point Lepreau NGS and one reference location near Saint John. NB Power also takes water samples from ponds, lakes, streams, and runoff, mostly from on-site locations. Tritium was detected in a few samples during the current period but was very low, ranging from 14 to 280 Bq·L⁻¹, which is below the drinking water limit recommended by Health Canada. Since carbon-14 releases from Point Lepreau NGS are low, the concentration of carbon-14 in these samples is very low as well and has been generally below the detection limit during the current licensing period.

Soil and sediment monitoring

CNSC staff confirmed that NB Power takes soil samples quarterly from eight monitoring location sites and from the local elementary school. Sediments are collected quarterly from ten locations. Cs-137 (cesium), Ac-228 (actinium), and

K-40 were detected in a few soil samples, and Be-7, Ac-228, and K-40 were detected in sediment samples analyzed. However, NB Power does not attribute these results to the operation of Point Lepreau NGS, noting that Cs-137 in soil and sediment around Point Lepreau NGS is from fallout of past atmospheric weapons tests and international events, and that many samples contain naturally occurring K-40, Ac-228, and Be-7. CNSC staff agrees with NB Power's analysis.

Food and vegetation monitoring

CNSC staff confirmed that NB Power monitors common food (garden vegetables and berries) and vegetation (lichen and moss) at various locations around Point Lepreau NGS. Over the current licensing period, K-40 was detected in a few samples analyzed (ranging from 0.02 to 36 Bq·kg⁻¹); however, NB Power attributes this to naturally occurring K-40. CNSC staff agrees with NB Power's analysis.

NB Power analyzes tritium (H-3) and carbon-14 (C-14) in food and vegetation if the H-3 or C-14 weekly releases are more than one percent of the weekly Derived Release Limit (DRL). During the current licensing period, the releases were less than one percent of the weekly DRL. Since H-3 and C-14 releases from the site were low, the expected concentrations of H-3 and C-14 in food and vegetation are below the detection limits with no adverse impacts to the environment and the public.

Monitoring of species of cultural importance to Indigenous communities

CNSC staff confirmed that through NB Power's ongoing interactions with the Indigenous communities, NB Power has established a comprehensive list of species of interest to Indigenous communities [132].

NB Power acquires samples of these species when possible and incorporates them into the Point Lepreau NGS environmental monitoring program. NB Power continuously adds previously unidentified plant resources discovered on-site to the sampling list and collects them at a frequency that is appropriate for the particular resource.

Seafood and other sea plants monitoring

Seafood that NB Power monitors at Point Lepreau NGS includes clams, dulse, fish, lobster, periwinkles, aquaculture salmon, and scallops. In addition, NB Power monitors sea plants including various species of seaweed (for example, *Ascophyllum* sp). K-40, at concentration ranging from 100 to 230 Bq·kg⁻¹, was detected in few samples; however, NB Power notes that this is naturally occurring K-40 and is not attributable to the operation of Point Lepreau NGS. CNSC staff agrees with NB Power's analysis.

Protection of people

This specific area within the environmental protection SCA aims to ensure that members of the public are not exposed to unreasonable risk with respect to hazardous substances discharged from the NPPs, and that the radiation dose

received by a member of the public from radionuclides does not exceed the regulatory annual public dose limit of 1 mSv/year.

CNSC staff concluded that the public living in the vicinity of Point Lepreau NGS were protected from the impacts of releases of radiological and non-radiological substances from the facility between 2017 and 2020.

Performance information from technical reviews of quarterly and annual reports, as well as the results of inspections from 2017 to 2020 met regulatory requirements in this specific area.

Estimated dose to the public

Radionuclides are released from the routine operation at the Point Lepreau NGS. CNSC staff confirmed that NB Power's REMP monitors radiological releases from the Point Lepreau NGS to calculate public dose in order to demonstrate compliance with the public dose limit of 1 mSv per year, and to meet the CNSC's requirement for following the ALARA principle, taking into account social and economic factors.

NB Power's REMP at Point Lepreau NGS considers two main exposure pathways (airborne and liquid exposure pathways) to calculate the DRLs and to estimate radiation dose to a member of the public. Therefore, total dose to the Representative Person comes from airborne and liquid exposure pathways. The estimated dose to the public from Point Lepreau NGS for 2017 to 2020 is provided in Table 16.

Table 16: Estimated annual dose to a member of the public from 2017 to 2020 from Point Lepreau NGS

Year	Source of dose to the representative person		Total annual dose ($\mu\text{Sv}\cdot\text{a}^{-1}$)
	Airborne releases dose ($\mu\text{Sv}\cdot\text{a}^{-1}$)	Liquid releases dose ($\mu\text{Sv}\cdot\text{a}^{-1}$)	
2017	0.71	0.02	0.73
2018	0.64	0.08	0.72
2019	1.12	0.08	1.2
2020	1.29	0.03	1.32

Table 16 shows that the doses were well below the annual regulatory dose limit of 1 mSv for members of the public during the current licensing period, with the highest dose ($1.32 \mu\text{Sv}\cdot\text{a}^{-1}$ in 2020) being less than 0.2% of 1 mSv. Radiological releases from Point Lepreau NGS pose a negligible risk to human health.

Protection of people from hazardous substances

CNSC staff reviewed the reports on conventional (non-radiological) contaminants released to the environment submitted by NB Power to the NBDELG for the same period. The conclusion based on data assessed was that hazardous substances

released from Point Lepreau NGS are very low and pose a negligible risk to human health.

Under the federal [Canadian Environmental Protection Act, 1999](#) (CEPA 1999), NB Power reports on hazardous substances generated at Point Lepreau NGS to the NPRI and via ERRIS. Data from those reports also confirmed that the people around Point Lepreau NGS are protected from non-radiological substances.

Environmental Risk Assessment

An Environmental Risk Assessment (ERA) of nuclear facilities is a systematic process used by licensees to identify, quantify and characterize the risk posed by contaminants and physical stressors in the environment on human and other biological receptors, including the magnitude and extent of the potential effects associated with a facility. The ERA serves as the basis for the development of site-specific environmental protection measures, including EMP. The results of these programs, in turn, inform and refine future revisions of the ERA.

In 2020, NB Power submitted an updated ERA for the Point Lepreau NGS in accordance with CSA N288.6-12, *Environmental risk assessment at Class I nuclear facilities and uranium mines and mills* which stipulates that licensees must review and revise their ERA every five years. The ERA included an Ecological Risk Assessment (EcoRA) and a Human Health Risk Assessment (HHRA) for radiological and non-radiological (hazardous) contaminants and physical stressors. In June 2021, NB Power revised the Point Lepreau NGS 2020 ERA to address CNSC staff comments.

CNSC staff agree with NB Power's conclusions that the overall risk to the environment and human health from Point Lepreau NGS is acceptably low.

There is a potential for chemical stressors of low probability and limited extent for some aquatic and terrestrial biota, but no risk is expected from physical stressors. CNSC staff requested that NB Power further assess this potential risk and, in response, NB Power suggested recommendations as part of their revision of the 2020 ERA, which include increased soil and surface water sampling activities, and consideration of exposure of amphibians to contamination in soil and sediment. In addition to this, NB Power also suggested a recommendation to record seal presence, entrapment, and mortality events in the area to confirm the expectation that there is no risk from physical stressors. CNSC staff reviewed and agrees with NB Power's recommendations and will follow NB Power's progress toward completion of their ERA recommendations. Overall, CNSC staff found that the 2020 ERA satisfied all requirements, and therefore, deemed it acceptable.

NB Power is expected to revise and submit an updated ERA every five years, or if there is a change to the facility's operations or in the scientific understanding and methodology of the ERA. The next update of the Point Lepreau NGS ERA is expected in 2025. CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Independent environmental monitoring program (IEMP)

CNSC staff conducted independent environmental monitoring program (IEMP) work around the Point Lepreau NGS in 2014, 2015, 2016, 2017 and 2020/2021. The results for the years up to 2017 (available on the CNSC's IEMP webpage) indicated that the general public and the environment in the vicinity of Point Lepreau NGS were protected and that there were no expected health impacts.

Due to COVID-19, some planned IEMP samples from 2020 were completed in 2021. This campaign will be referred to as "2020/2021". CNSC staff developed the 2020/2021 site-specific sampling plan with input from Indigenous communities to ensure meaningful results are obtained.

The sampling plan focuses on radiological and hazardous contaminants and takes into consideration NB Power's REMP and CNSC's regulatory knowledge of the site. The results for samples collected in 2020 indicated that the environment and people in the vicinity of Point Lepreau NGS were protected. The CNSC's laboratory in Ottawa is currently analyzing samples taken in 2021. This is further described in the EPR report provided [here](#) for the Point Lepreau NGS on the CNSC website. The results from the 2020/2021 program will be available on the CNSC's IEMP webpage before the licence hearing.

CNSC staff conclude that the monitoring and assessment of environmental data are well developed and consistently implemented at Point Lepreau NGS; and meet regulatory requirements.

3.9.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.9.3.1 Past Performance

CNSC staff have assessed NB Power's programs under the environmental protection SCA at the Point Lepreau NGS and concluded that during the current licensing period, NB Power met the applicable regulatory requirements.

3.9.3.2 Regulatory Focus

CNSC staff will schedule compliance activities against [REGDOC-2.9.1](#) version 1.1 once it has been implemented by NB Power by December 15, 2025. CNSC staff will continue to verify NB Power performance and compliance in all aspects of the environmental protection SCA through programs and processes including effluent and emissions control, the EMS, environmental assessment and monitoring, ERA, protection of people and the IEMP.

3.9.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] includes enhancement plans regarding the following specific areas of the environmental protection SCA: estimated dose to

the public, effluent and emissions controls, environmental management system, and environmental risk assessment.

NB Power is making progress toward developing implementation plans for CSA N288.2, *Guidelines for calculating the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents*, in accordance with the timelines indicated in the proposed IIP actions being June 30, 2022.

NB Power has also committed in its IIP actions to update the Point Lepreau NGS management system to reflect the latest versions of CSA N288.1, CSA N288.2-14, and CSA N290.16-16, *Requirements for beyond design basis accidents*. Regarding CSA N288.2-14, Point Lepreau NGS is assessing the outstanding gaps related to radiological and meteorological parameters, and uncertainties.

In preparation for the implementation of the [REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures, version 1.1](#), CNSC staff raised an action item on NB Power to submit the implementation plan by August 7, 2020. NB Power submitted the implementation plan, and in November 2020, CNSC staff reviewed the plan and concluded that the implementation plan was satisfactory and closed the action item.

Based on the current program, these timelines in the IIP actions are acceptable to CNSC staff. CNSC staff will review all submissions related to the implementation of these standards and monitor program implementation through the conduct of compliance verification activities to ensure the environmental protection programs for Point Lepreau NGS will continue to provide adequate protection for the health and safety of people and the environment.

3.9.4 Conclusion

NB Power continues to implement and maintain an effective environmental protection program at the Point Lepreau NGS. As documented in the Environmental Protection Review Report, CNSC staff confirmed that NB Power implements and maintains effective environmental protection measures to adequately protect the environment and the health of persons in accordance with regulatory requirements. CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

3.10 Emergency Management and Fire Protection

The emergency management and fire protection SCA covers emergency plans and emergency preparedness programs which exist for emergencies and for non-routine conditions.

This CMD covers the following specific areas of emergency management and fire protection:

- conventional emergency preparedness and response
- nuclear emergency preparedness and response
- fire emergency preparedness and response
- fire protection program

Licence conditions 10.1 and 10.2 in the proposed PROL pertain to implementing and maintaining an emergency preparedness program and a fire protection program, respectively. Compliance verification criteria are detailed in section 10 of the proposed LCH.

3.10.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the emergency management and fire protection SCA over the current licensing period:

EMERGENCY MANAGEMENT AND FIRE PROTECTION			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's emergency management and fire protection programs meet regulatory requirements.			

3.10.2 Discussion

NB Power implements and maintains an emergency preparedness program, and conducts exercises in accordance with [REGDOC- 2.10.1, Nuclear Emergency Preparedness and Response](#). NB Power also implements and maintains a fire protection program in accordance with CSA N293-12, *Fire Protection for Nuclear Power Plants*. CNSC staff have assessed that NB Power continues to meet regulatory requirements and is performing satisfactorily with respect to this SCA.

NB Power has implemented a number of initiatives pertaining to this SCA over the current licensing period, including the following:

- commissioning of a new Off-Site Emergency Operations Centre (OEOC)
- participation in two major emergency exercises, both titled Synergy Challenge which took place in March 2018 and October 2021
- implementation of Direct Plant Data Transfer capabilities between the Main Control Room and CNSC Emergency Operations Facility

- introduction of an additional Emergency Response Team (ERT) crew

Details of CNSC staff assessment in this SCA are presented in the following sections.

Conventional emergency preparedness and response

CNSC staff confirmed that NB Power continues to maintain conventional emergency preparedness and response programs at Point Lepreau NGS. CNSC staff noted that emergency response personnel are available on-site 24 hours a day to respond to any type of emergency.

CNSC staff conducted field inspections and verified that the appropriate equipment continue to be maintained for a medical response, hazardous materials response and other conventional hazards that may be present [73]. CNSC staff note that NB Power continues to maintain the appropriate training for responding to conventional emergencies.

CNSC staff conclude that NB Power meets regulatory requirements in this specific area.

Nuclear emergency preparedness and response

CNSC staff confirmed that emergency preparedness at Point Lepreau NGS is governed by the Point Lepreau *Emergency Response Plan* and its supporting program documentation.

The Point Lepreau Emergency Response Plan designates the New Brunswick Emergency Measures Organization (NBEMO) as being responsible for the protection of the public. This is documented in the Point Lepreau Nuclear Offsite Emergency Plan volumes I and II.

CNSC staff reviewed the Emergency Response Plan at Point Lepreau NGS and confirmed it captures all the required components. The plan and its elements meet the regulatory requirements as set out in [REGDOC-2.10.1, Nuclear Emergency Preparedness and Response](#) and are in a state of readiness.

As part of their emergency preparedness programs, NB Power conducts emergency preparedness training, drills and exercises to ensure that their sites have adequate and robust emergency notification and response capability from their own on-site staff and/or nearby emergency services with which they have memoranda of understanding or agreements for the provision of assistance in the event of an emergency.

Exercise synergy challenge (2018)

CNSC staff confirmed that on October 3-4, 2018, NB Power conducted a full-scale (two-day) exercise named “Synergy Challenge 2018” at Point Lepreau NGS. The objective of Synergy Challenge 2018 was to test the overall emergency response capabilities of more than 35 participating organizations, including the CNSC and some non-government agencies, with an emphasis on the recovery phase. CNSC staff participated in the exercise by activating its Emergency Operations Centre in Ottawa, and having CNSC staff and liaison officers located

in NB Power's incident command section at the Point Lepreau NGS, the NBEMO Provincial Emergency Operations Centre in Fredericton, and at Health Canada in Ottawa.

Exercise synergy challenge (2021)

CNSC staff confirmed that on October 6-7, 2021, NB Power conducted a full-scale priority nuclear emergency training exercise named "Synergy Challenge" at Point Lepreau NGS. The exercise's strategic objective was to assess the preparedness of NB Power to respond to multiple events which resulted in a nuclear emergency. CNSC staff participated in this full-scale priority exercise, by activating its Emergency Operations Centre in Ottawa virtually due to the COVID-19 pandemic, and having staff located in NB Power's incident command section at the Point Lepreau NGS. This full-scale exercise also involved multiple stakeholders representing the local, provincial, and federal governments, as well as international partners and organizations. Federal senior-level decision makers including that of the CNSC were involved which permitted the exercise to meet a suggestion from the 2019 International Atomic Energy Agency (IAEA) Emergency Preparedness Review (EPREV) peer review mission to Canada. The exercise also met another EPREV suggestion by featuring a simulated nuclear emergency triggered by a security event. Synergy Challenge 2021 further tested the interoperability of response organizations and on-site emergency response plans. CNSC staff conducted an inspection on NB Power's response during exercise Synergy Challenge 2021. As part of the NB Power Synergy Challenge 2021 exercise, CNSC staff conducted a Type II inspection on emergency preparedness at the Point Lepreau NGS 2021. Staff involved in the exercised performed well. Items of negligible safety significance were identified which included not submitting the self-assessment report to the CNSC within forty (40) days and a few minor procedural deficiencies [22] [133].

Equipment or facility upgrades

CNSC staff confirmed that NB Power has undertaken a number of initiatives during the current licensing period, including the following:

- In January 2019, NB Power completed its work to establish the capacity for direct plant data transfer from Point Lepreau NGS to the CNSC's Emergency Operating Centre (EOC) during nuclear emergencies. NB Power now has the capability to transfer plant data to the CNSC's Emergency Operations Centre in Ottawa. CNSC staff completed the assessment of NB Power's data transfer capabilities and found that it met regulatory requirements.
- In November 2017, NB Power submitted the detailed design documentation for a new Offsite Emergency Operations Centre (OEOC) located in St. George, NB. In February 2019, the new OEOC was declared operational by NB Power and CNSC staff conducted a field inspection in April 2019 to validate its readiness. CNSC staff identified a number of non-compliances, including procedural deficiencies and a lack of emergency power supply (backup generator). CNSC staff confirm that NB

Power corrected the non-compliances. CNSC staff conducted a reactive field inspection in September 2019 and confirmed that corrective actions were completed and meet regulatory requirements. CNSC staff determined that the OEOC is functional and meets regulatory requirements for a backup emergency operations facility [134].

Overall, CNSC staff determined that NB Power meets regulatory requirements in this specific area.

Fire emergency preparedness and response

CNSC staff confirmed that the Point Lepreau NGS Emergency Response Team (ERT) is part of the minimum shift complement for the Point Lepreau NGS and responds to events within the protected area and the SRWMF.

CNSC staff noted that NB Power's fire response program continued to be maintained through a comprehensive training and drill program. Fire training occurs on-site at the live fire training facility and the Point Lepreau ERT continues to train and drill with its mutual aid partners, the Musquash Fire Department and Saint John Fire Department.

CNSC staff confirmed that in February 2021, the Point Lepreau NGS ERT transitioned from a five-crew to a six-crew shift schedule as part of the implementation of [REGDOC-2.2.4, Fitness for Duty –Managing Worker Fatigue](#), which allows for more training and coverage. With the onset of the COVID-19 pandemic, the Point Lepreau NGS ERT was utilized for the implementation of the Pandemic Response Plan (see section 3.1.2: Business Continuity for additional information on COVID-19 Response) which included COVID-19 screening for personnel. A COVID-19 Response Team (CRT), led by the Point Lepreau NGS Fire Chief, was established in August 2020. The CRT provides ongoing support for COVID-19 response and is comprised of members from the Health Unit, Safety Department, Corporate Office, ERT and other Point Lepreau NGS support staff.

In 2021, CNSC staff conducted a Type II compliance inspection and identified that NB Power was not compliant with the drill requirements and expectations of CSA N293-12 and NFPA 600-2010 in terms of frequency and scope. The-safety significance of the findings was low. CNSC is currently reviewing NB Power's proposed corrective actions.[135 130][136]

During filed inspections in Quarter 1 2021/2022 it was found that some fire extinguishers were not inspected in 2021. NB Power implemented corrective actions and no enforcement was necessary [137]

CNSC staff determined that NB Power meets regulatory requirements in this specific area.

PHT pump motor fire

On February 5, 2021, CNSC staff received the regulatory notification and reporting about a fire on the PHT pump motor 3, which required the Point Lepreau NGS ERT to respond [138]. The ERT effectively worked along with its

mutual aid partners to extinguish the fire. In accordance with NB Power's self-assessment process, investigations were completed and a number of opportunities for improvement were identified and implemented by the ERT in regard to the fire response. NB Power continues to work closely with mutual aid partners, including engaging in routine combined training to ensure safe and coordinated responses to the station. CNSC staff are satisfied with the actions taken by NB Power.

By incorporating the results of CNSC staff compliance findings and observations, and recommendations from third-party reviews into the drill and training program, the performance of ERTs continues to improve and CNSC staff are satisfied with NB Power's capabilities to respond to a fire at Point Lepreau NGS.

CNSC staff determined that NB Power meet the regulatory requirements in this specific area.

Fire protection program

NB Power has a fire protection program to minimize both the probability of occurrence, and the consequences of fire at the Point Lepreau NGS and associated facilities. The program identifies the procedures and processes to demonstrate a planned, coordinated, and controlled approach to fire protection.

The implementation of the fire protection program requires that NB Power maintains and updates the site's fire protection assessments - Code Compliance Review (CCR), Fire Hazard Assessment (FHA), and Fire Safe Shut Down Analysis (FSSA) every five years and as necessary to reflect plant modifications, significant changes in fire hazards, operating experience, and operational changes. CNSC staff reviewed the most recent update (2018) of the fire protection assessments. CNSC staff note that NB Power satisfactorily dispositioned and addressed all CNSC staff comments [139].

NB Power is required to perform a plant condition inspection annually and a fire protection program audit every three years to ensure that the implementation of the fire protection program continues to meet regulatory requirements. CNSC staff review of NB Power's 2019 plant conditions inspection report did not identify any areas of concern.

CNSC staff conducted one fire protection focused Type II inspection from November 30, 2020 to January 22, 2021 to verify that NB Power is maintaining the fire protection program in a manner that is consistent with CNSC regulatory requirements and expectations [140]. As a result, two low and one negligible safety significant findings were identified, which resulted in two non-compliances. In response to the first non-compliance NB Power has developed a corrective action plan to address process improvements to become compliant with all fire protection preventive maintenance orders. In response to the second non-compliance NB Power is making process improvements to minimize the backlog of fire protection impairments. CNSC staff will continue to monitor the implementation of these corrective actions and is satisfied with NB Power's progress to-date.

CNSC staff determined that NB Power's fire protection program meets the regulatory requirements in this specific area.

3.10.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.10.3.1 Past Performance

CNSC staff have assessed NB Power's programs under the emergency management and fire protection SCA at the Point Lepreau NGS. During the current licensing period, NB Power meet the regulatory requirements for the emergency management and fire protection SCA.

3.10.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the emergency management and fire protection SCA, including conventional, nuclear and fire emergency preparedness and response as well as the fire protection program.

3.10.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] includes enhancement plans regarding the following specific areas of the emergency management and fire protection SCA: conventional emergency preparedness and response, nuclear emergency preparedness and response.

CNSC staff concurs with NB Power that the IIP actions documented in the Aggregate Findings Resolution Plan were opportunities for improvement. Some of the IIP actions from this plan are outlined below.

NB Power committed to enhance their conventional emergency preparedness and response program at the Point Lepreau NGS. Lower tiered process documents in the Point Lepreau NGS management system are undergoing minor revision to clarify the process interfaces that will be used during conventional response scenarios. The required date of completion of this IIP action is June 2022.

NB Power also considered the critical functions of Emergency Mitigating Equipment (EME) when identifying maintenance and testing activities, and compensatory measures. The critical functions of EME serve as the basis for the planned activity to add EME to the Equipment Important to Emergency Response (EITER) list and to define the function and compensatory measures. The critical functions of EME will be further supported by NB Power's governance documents for the Point Lepreau NGS. The required date of completion of this IIP action is June 2023.

Based on the current program, the timelines in the IIP actions are acceptable to CNSC staff. CNSC staff will review all submissions related to these IIP actions through the conduct of compliance verification activities to ensure the emergency

management and fire protection processes and programs for Point Lepreau NGS will continue to provide adequate protection for emergencies and for non-routine conditions.

3.10.4 Conclusion

NB Power continues to implement and maintain an effective emergency management and fire protection program at the Point Lepreau NGS in accordance with regulatory requirements. CNSC staff confirmed that NB Power has sufficient provisions to ensure preparedness and a response capability that would mitigate the effects of accidental releases of nuclear and hazardous substances on the environment and affect the health and safety of persons.

CNSC staff confirmed that NB Power has committed to implementing measures to meet applicable modern codes and standards.

Based on CNSC staff assessments of the NB Power licence application, past performance, and considerations for the PSR-2, CNSC staff conclude that NB Power maintains an adequate licensing basis for continued safe operations.

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. For the Point Lepreau NGS, this SCA covers both the NPP and the on-site SRWMF. The waste management SCA also covers the planning for decommissioning the Point Lepreau NGS facilities.

This CMD covers the following specific areas of waste management:

- waste characterization
- waste minimization
- waste management practices
- decommissioning plans

Licence conditions 11.1 and 11.2 in the proposed PROL pertain to implementing and maintaining a waste management program and a decommissioning strategy, respectively. Licence condition 15.1 pertains to implementing and maintaining a waste management program for the SRWMF. Compliance verification criteria are detailed in sections 11 and 15.1 of the proposed LCH.

3.11.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the waste management SCA over the current licensing period:

WASTE MANAGEMENT			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's programs in the waste management SCA meets regulatory requirements.			

3.11.2 Discussion

The waste management SCA covers NB Power's site wide waste management program, including the SRWMF, and the decommissioning planning for the site.

CNSC staff confirmed that NB Power minimizes the production of wastes through various plans, programs and procedures while additionally minimizing impacts from such wastes on workers and the environment.

Details of CNSC staff assessment in this SCA are presented in the following sections.

Waste characterization and minimization

CNSC staff confirmed that NB Power has a nuclear waste management program to minimize, control and properly dispose of radioactive waste. NB Power segregates solid waste into radioactive, likely clean, inactive, and recyclable waste in accordance with their program document for controlling waste. NB Power has a Likely Clean Program that screens all waste generated in the Zone 3 area² to separate likely clean waste from radioactive waste, thereby minimizing the amount of radiological waste sent to the SRWMF. Another important aspect to waste minimization is to increase employee awareness through training and discussing waste minimization during pre-job briefings.

During the current licensing period, CNSC staff conducted a waste management focused Type II inspection at Point Lepreau NGS to assess the implementation and performance of NB Power's radioactive waste management program, including the collection, segregation, storage, transfer and disposal of radioactive waste. CNSC staff verified NB Power activities to segregate waste generated and verified the compaction, shredding, sorting, and repackaging methods used. CNSC staff determined that these activities were compliant with the waste minimization requirements of CSA N292.3 *Management of Low and Intermediate-Level Radioactive Waste* clause 5.7.3 and compliant with the waste characterization requirements of CSA N292.3 clause 5.8.

² Under NB Power's RP program, Zone 3 areas are defined as areas that have a reasonable probability of contamination being present, either through the location of radioactive systems or through the nature of work performed. Contamination in normally accessible areas of Zone 3 is cleaned up as soon as practicable.

CNSC staff confirmed that NB Power has taken the necessary measures to minimize, segregate and characterize the nuclear wastes generated as a result of operating the Point Lepreau NGS, and NB Power meets all regulatory requirements in this specific area.

Waste management practices

The NB Power SRWMF is located on the Point Lepreau NGS site, within the exclusion zone. The waste storage process for operational waste includes short-term storage, within the station, which is then transferred for long-term storage at the SRWMF.

In its application for licence renewal, NB Power states that they will submit an implementation plan by March 30, 2022 for [REGDOC-2.11.1, Waste Management Volume 1: Management of Radioactive Waste](#).

Solid Radioactive Waste Management Facility (SRWMF)

The SRWMF is comprised of Phase I, II and III sites, which provide storage of solid radioactive material produced as by-products from the operation of the Point Lepreau NGS. The following is a description of each Phase:

- Phase I of the facility is used to store operational waste.
- Phase II is a dry storage facility for spent fuel.
- Phase III of the facility stores waste from re-tubing and other operations completed during the refurbishment outage.

CNSC conduct routine field inspections at the SRWMF. During inspections in 2018, 2019 and 2021 [141] at the SRWMF, CNSC staff verified the implementation of NB Power document in accordance with their program document for controlling waste, which defines their process for controlling and minimizing waste [142][143]. CNSC staff verified the records for the inventory of radioactive waste on-site, that waste tracking was traceable and all radioactive waste transfers were via a licensed receiver. CNSC staff regulatory oversight of these waste transfers concluded that NB Power demonstrated consistent and compliant management and control of waste handling and storage.

CNSC staff confirmed NB Power has taken the necessary measures to operate the SRWMF safely and meets all regulatory requirements in this specific area [144].

Decommissioning plans

In accordance with paragraph 3(k) of the [Class I Nuclear Facilities Regulations](#), NB Power is required to maintain a decommissioning plan throughout the life of the facility. NB Power maintains a Preliminary Decommissioning Plan (PDP) for the Point Lepreau NGS as per CSA N294-09 *Decommissioning of Facilities Containing Nuclear Substances* and CNSC Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities*.

Licensees are required to maintain an acceptable PDP that sets out how the nuclear facility will be decommissioned in the future. The PDP must be kept

current to reflect any changes in the site or facility and provide a credible basis for estimating the decommissioning cost.

On June 24, 2020, NB Power submitted a revised PDP in accordance with the requirement to update and submit the PDP for CNSC staff review every five years. The revised PDP provided the basis for periodic revision of the cost estimate for decommissioning.

CNSC staff assessed the PDP and found that it meets the requirements of Regulatory Guide G-219 and CSA N294-09.

NB Power is projecting end of operation in 2040 and continues to propose a deferred decommissioning strategy for Point Lepreau NGS. It is envisioned that the entire site will be decommissioned as a single project, conducted in phases aiming to achieve an end-state suitable for release from CNSC regulatory control.

In its application for licence renewal, NB Power states that they are conducting a gap analysis for future implementation of [REGDOC-2.11.2, Decommissioning](#) published in 2021.

The PDP and the associated cost estimate form the basis of the financial guarantee. The financial guarantee for the Point Lepreau NGS is described in section 5.2 of this CMD. As per the requirements of the current licence, the preliminary decommissioning plan is to be revised at a minimum every five years or when required by the Commission. The updated PDP was submitted by NB Power in 2020. The next PDP is to be submitted by NB Power in 2025.

Based on the assessment of the revised submission, CNSC staff conclude the NB Power's PDP, meets the regulatory requirements of CSA N294-09 and CNSC Regulatory Guide G-219.

3.11.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.11.3.1 Past Performance

NB Power's waste management program meet CNSC regulatory and performance objectives under the waste management SCA. CNSC staff monitored NB Power's implementation of this program through regular compliance verification activities.

3.11.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the waste management SCA, including waste management practices, characterization and minimization and decommissioning plans during this proposed licensing period.

3.11.3.3 IIP Improvements

The Point Lepreau NGS Periodic Safety Review #2 (PSR2) IIP that NB Power submitted on April 30, 2021 [6] includes enhancement plans regarding the

following specific areas of the waste management SCA: waste management practices and decommissioning plans.

In preparation for the implementation of both [REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*](#), [REGDOC-2.11.2, *Decommissioning*](#) and [REGDOC-3.3.1, *Financial guarantees for decommissioning of nuclear facilities and termination of licensed activities*](#) which were published in January 2021, NB Power is in the process of conducting gap analysis and will submit an implementation plan to align the waste management and planning for decommissioning programs at Point Lepreau NGS. This will be used to update the IIP actions as required in the next revision of the IIP actions planned for the spring of 2022 [7].

CNSC staff will review all submissions related to the implementation of these standards and monitor program implementation through the conduct of compliance verification activities to ensure the waste management and decommissioning programs for Point Lepreau NGS will continue to remove waste from the Point Lepreau NGS and provide plans for decommissioning to protect the health and safety of people and the environment.

3.11.4 Conclusion

Based on CNSC staff assessments of NB Power's licence application and past performance, CNSC staff conclude NB Power's waste management program establishes an adequate licensing basis and continues to meet regulatory requirements.

Based on the assessment of the 2020 version of the PDP, CNSC staff conclude that the PDP meets the regulatory requirements in CSA N294-09, and CNSC Regulatory Guide G-219.

3.12 Security

The security SCA covers the programs licensees are required to implement in support of the requirements stipulated in the [Nuclear Security Regulations](#), associated regulatory documents and orders, as well as the expectations for their facilities or activities.

This CMD covers the following specific areas of security:

- facilities and equipment
- response arrangements
- security practices
- drills and exercises
- cyber security

Licence condition 12.1 in the proposed PROL pertains to implementing and maintaining a security program. Compliance verification criteria are detailed in section 12 of the proposed LCH.

3.12.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the security SCA over the current licensing period:

SECURITY			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's nuclear security program meets regulatory requirements.			

3.12.2 Discussion

The *Nuclear Security Regulations* and CNSC regulatory documents [REGDOC-2.12.1 \(Vol. I\)](#), [REGDOC-2.2.4 \(Vol. III\)](#), [REGDOC-2.2.4 \(Vol. II\)](#) and [REGDOC-2.12.1 \(Vol II\)](#) outline the requirements related to a nuclear security program. They require NB Power to implement a nuclear security program. The nuclear security program puts in place provisions to prevent, detect and stop malevolent acts, such as theft, sabotage, unauthorized access, illegal transfer or other acts involving nuclear material, other radioactive substances or their associated facilities.

CNSC staff noted that NB Power will proceed with the following projects over the proposed licensing period:

- purchase and installation of a new Emergency Services and Security dispatch radio system
- additional security measures at the SRWMF

As part of the program, NB Power is subject to annual inspections and biennial security exercises in accordance with regulatory requirements. Details of CNSC staff assessment in this SCA are presented in the following sections. In 2021, CNSC staff conducted a Type II inspection against the nuclear security requirements resulting in all compliant findings.

Facilities and equipment

NB Power security at the Point Lepreau NGS is carrying out the plan for its security operations through its life cycle management program. NB Power acquired and put into service new equipment, such as new modern search screening devices. Furthermore, re-design of NB Power's central alarm station (CAS) is almost completed.

CNSC staff conclude that NB Power's facilities and equipment is managed in accordance with regulatory requirements.

Response arrangements

NB Power continues to hold major security exercises every two years as required by the [Nuclear Security Regulations](#). Two exercises were conducted over the licensing period (2017 and 2019); both security exercises were comprised of complex force on force scenarios that challenged the Nuclear Response Force (NRF) and the licensee's Incident Command capabilities. During this licensing period, NB Power has renewed their agreement with the Royal Canadian Mounted Police (RCMP) as the off-site response for the Point Lepreau NGS.

CNSC staff conclude that NB Power response arrangements meet regulatory requirements.

Security practices

CNSC staff confirmed that during the current licensing period, NB Power updated security operating procedures at the Point Lepreau NGS and ensured that its contingency plans meet the Design Basis Threat (DBT). NB Power continues to refine their operational procedures as needed.

CNSC staff concluded that NB Power security practices meet regulatory requirements.

Drills and exercises

CNSC staff confirmed that NB Power exceeds expectations in their drills and exercises program as they continue to incorporate additional elements including training with an off-site response force.

NB Power continues to contribute resources to assist CNSC staff in the performance-testing program. NB Power supplied expert staff and participants to the Canadian Adversary Testing Team and provided logistical and support staff for exercise development as well as operational experience from in-house training activities.

CNSC staff determined that NB Power maintains a drill and exercise program that meets all regulatory requirements.

Cyber security

CNSC staff noted that during the current licensing period, NB Power maintained their cyber security program to protect computer-based systems that perform safety, security, emergency preparedness, and safeguard functions against cyberattacks.

CNSC staff also confirmed that NB Power completed updating their cyber security program to meet the requirements of CSA N290.7-14 in 2020.

3.12.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.12.3.1 Past Performance

During the current licensing period, CNSC staff confirmed NB Power completed the following improvements in the nuclear security training and drill program:

- Training of staff is being conducted annually at Canadian Forces Base Gagetown (training was paused during the pandemic but will resume post-COVID).
- NB Power has secured an on-site facility to conduct weekly Immediate Rapid Deployment (IRD) drills.
- NB Power has also improved tabletop exercises with off-site response.

3.12.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the security SCA including security operations, response arrangement, security practices, drills, and exercises.

3.12.3.3 Proposed Improvements

CNSC staff noted that NB Power continues to use new technologies, security equipment and enhanced barriers to improve its security program. Future upgrade projects include completion of the central alarm station, the emergency protective services radio system and the security screening area equipment. The central alarm system is scheduled to be fully operational by late winter of 2022.

CNSC staff are proposing amendments to the *Nuclear Security Program*, which includes adding a requirement requiring NPP licensees to assess their vulnerability to cyber threats, and that cyber threat be included in their threat and risk assessment (TRA). The objective of this requirement is to ensure that NPP licensees are able to detect and respond to cyber attacks targeting prescribed information and systems performing functions important to nuclear safety, security, emergency preparedness and safeguards.

CSA N290.7-21 is expected to be published in Q4 2021. CNSC staff will require NB Power to perform a gap analysis between their current CSA N290.7-14 cyber security program and the requirements in the new revision of CSA N290.7-21.

3.12.4 Conclusion

Based on CNSC staff assessments of NB Power's licence application and past performance, NB Power continued to implement and maintain an effective nuclear security program at the Point Lepreau NGS and continues to upgrade security equipment.

CNSC staff conclude that NB Power's programs under the security SCA at Point Lepreau NGS meet regulatory requirements, establishes an adequate licensing basis and makes provisions for the maintenance of national security.

3.13 Safeguards and Non-Proliferation

The safeguards and non-proliferation SCA covers the programs and activities required for the successful implementation of Canada's obligations arising from the Canada/International Atomic Energy Agency (IAEA) safeguards agreements, as well as other measures arising from the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT) and bilateral Nuclear Cooperation Agreements.

This CMD covers the following specific areas of 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

Licence condition 13.1 in the proposed licence pertains to implementing and maintaining a safeguards program. Compliance verification criteria are detailed in section 13 of the proposed LCH.

3.13.1 Trends

The following table indicates the overall annual safety performance ratings and trends for the safeguards and non-proliferation SCA over the current licensing period:

SAFEGUARD AND NON-PROLIFERATION			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA
Comments			
NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's safeguards and non-proliferation program meets regulatory requirements.			

3.13.2 Discussion

The following publications contain regulatory requirements that are relevant over the current licensing period:

- [REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy*](#) (2018)
- [REGDOC-2.13.2, *Import and Export*](#) (2018)

NB Power is required to implement and maintain a program at the Point Lepreau NGS to ensure the effective implementation of both safeguards measures and nuclear non-proliferation commitments.

NB Power's safeguards program at the Point Lepreau NGS is expected to conform to measures required by the CNSC to meet Canada's international safeguards obligations as well as other measures arising from the NPT.

Pursuant to that NPT, Canada has entered into a Comprehensive Safeguards Agreement³ and Additional Protocol⁴ with the IAEA (hereafter, the safeguards agreements). The objective of the safeguards agreements is for the IAEA to provide annual assurance to Canada and to the international community that all declared nuclear material is in peaceful, non-explosive uses and that there is no indication of undeclared material.

The CNSC provides the mechanism, through the NSCA, regulations and a licence condition, for the IAEA to implement the safeguards agreements. Conditions for the application of IAEA safeguards are contained in the Point Lepreau NGS PROL, and criteria in order to meet the conditions are contained in the associated Point Lepreau NGS LCH and in CNSC regulatory document [REGDOC-2.13.1 Safeguards and Nuclear Material Accountancy](#).

Compliance includes the timely provision of reports on the movement and location of all nuclear materials, the provision of access and assistance to IAEA staff for safeguards activities, the submission of annual operational information to the IAEA, additional protocol updates, and accurate design information on plant operations and procedures.

Details of CNSC staff assessment in this SCA are presented in the following sections.

Nuclear material accountancy and control

The CNSC published [REGDOC-2.13.1, Safeguards and Nuclear Material Accountancy](#) in February 2018. [REGDOC-2.13.1](#) sets out requirements and guidance for safeguards programs. The requirements and guidance in this document are essential to Canadian compliance with the safeguards agreements entered into with the IAEA and are consistent with modern national and international practices.

CNSC staff requested NB Power to provide an implementation plan based on a gap analysis for meeting the requirements of [REGDOC-2.13.1](#) in July 2018. The gap analysis revealed that NB Power was in compliance with all requirements of [REGDOC-2.13.1](#), except for the use of the Nuclear Material Accounting Reporting (NMAR) system [145]. NB Power took the appropriate actions to implement reporting through the NMAR system.

In 2019, CNSC staff verified that corrective measures put in place are acceptable and confirmed that NB Power fully implemented [REGDOC-2.13.1](#).

³ Agreement between the Government of Canada and the IAEA for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons. February 21, 1972.

⁴ Protocol Additional to the Agreement between Canada and the IAEA for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons. October 11, 2000.

CNSC staff determined that NB Power meets regulatory requirements in this specific area, including the new requirements of [REGDOC-2.13.1](#).

Access and assistance to the IAEA

CNSC staff confirmed that pursuant to the Canada/IAEA safeguards agreements and Point Lepreau NGSs licence conditions, NB Power granted timely access and provided adequate assistance to the IAEA for safeguards activities at the Point Lepreau NGS. While the IAEA encountered minor implementation issues during a few inspections, the corrective actions were acceptable to the IAEA.

CNSC staff determined that the NB Power met the regulatory requirements in this specific area.

Operational and design information

CNSC staff confirmed that during the current licensing period, NB Power submitted their annual operational programs, with quarterly updates for their facilities, to CNSC staff on schedule. CNSC staff were satisfied with the information provided and conclude that NB Power meets the CNSC submission requirements.

CNSC staff determined that the NB Power meets the regulatory requirements in this specific area.

Safeguards equipment, containment, and surveillance

CNSC staff confirmed that NB Power supported IAEA equipment operation and maintenance activities, including maintenance and installation of surveillance equipment (such as IAEA cameras, seals and spent fuel monitors) to ensure the effective implementation of safeguards measures at each facility.

CNSC staff and NB Power continued to engage with the IAEA on a revised equipment-based approach for the verification of spent fuel transfers at CANDU sites as part of the IAEA's revised State-level approach for Canada. The revised approach will help ensure that the IAEA will continue to be able to verify that all nuclear material in Canada remains in peaceful uses.

CNSC staff determined that the NB Power meet the regulatory requirements in this specific area.

Import and export

CNSC staff verified that the scope of NB Power's non-proliferation program under the current licence is limited to tracking and reporting of foreign obligations and origins of nuclear material. This tracking and reporting assists the CNSC in the implementation of Canada's bilateral Nuclear Cooperation Agreements with other countries. If NB Power imports or exports controlled nuclear substances, equipment or information as identified in the [Nuclear Non-proliferation Import and Export Control Regulations](#), NB Power will require an import or export licence separate from the licensing of their operations in accordance with the regulations.

3.13.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.13.3.1 Past Performance

CNSC staff noted that during the current licensing period, NB Power provided CNSC staff and the IAEA with all requested reports and necessary information, including nuclear material accounting, to meet the safeguards and non-proliferation regulatory requirements.

Overall, NB Power's safeguards and non-proliferation program meets CNSC requirements.

3.13.3.2 Regulatory Focus

CNSC staff will continue to verify NB Power performance and compliance in all aspects of the safeguards and non-proliferation SCA including through participation in IAEA inspections, evaluations independent of the IAEA, nuclear material accountancy and control, safeguards equipment, containment and surveillance, imports and exports.

3.13.3.3 Proposed Improvements

No changes are anticipated for this SCA.

3.13.4 Conclusion

NB Power continued to maintain the safeguards and non-proliferation program at Point Lepreau NGS and implemented [REGDOC-2.13.1](#). CNSC staff confirm that NB Power's program maintains adequate safeguards and nuclear material accountancy in accordance with regulatory requirements.

3.14 Packaging and Transport

The packaging and transport SCA pertain to programs that cover the safe packaging and transport of nuclear substances to and from the licensed facility.

Licence condition 14.1 in the proposed licence pertains to implementing and maintaining a packaging and transport program. Compliance verification criteria are detailed in section 14 of the proposed LCH.

3.14.1 Trends

The following table indicates the overall annual safety performance ratings and trends for packaging and transport SCA over the current licensing period:

PACKAGING AND TRANSPORT			
Overall Compliance Ratings			
2017	2018	2019	2020
SA	SA	SA	SA

Comments

NB Power continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude NB Power's packaging and transport program meets regulatory requirements.

3.14.2 Discussion

NB Power has developed and implemented a packaging and transport program to ensure all shipments leaving the Point Lepreau NGS site are in compliance with the [Packaging and Transport of Nuclear Substances Regulation](#), 2015 and the [Transportation of Dangerous Goods Regulations](#). NB Power's packaging and transport program covers elements of package design and maintenance, and the registration for use of certified packages as required by the regulations. Details of CNSC's staff assessment are presented in the following paragraphs.

The [Packaging and Transport of Nuclear Substances Regulation](#), 2015 apply to the packaging and transport of nuclear substances, including the design, production, use, inspection, maintenance and repair of packages, and the preparation, consigning, handling, loading, carriage and unloading of packages.

NB Power is required to have appropriate training for personnel involved in the handling, offering for transport and transport of dangerous goods at the Point Lepreau NGS site, and is required to issue a training certificate to those workers in accordance with the [Transportation of Dangerous Goods Regulations](#).

There were no significant events reported under the [Packaging and Transport of Nuclear Substances Regulations](#), 2015 for consignments transported to or from the Point Lepreau NGS site.

CNSC staff conducted three packaging and transport inspections at the Point Lepreau NGS site over the current licensing period. As a result of the inspections, there were no issues reported, and only one low safety significant non-compliance on transport of radioactive material was observed [146]. NB Power took immediate actions to properly mark a shipping package in accordance with the regulations. CNSC staff are satisfied with the corrective actions taken by NB Power. CNSC staff determined that packaging and transport of nuclear substances at the Point Lepreau NGS site meets regulatory requirements.

3.14.3 Summary

A summary of the licensee's past performance, challenges and proposed improvements are presented in the following subsections.

3.14.3.1 Past Performance

NB Power's packaging and transport program met CNSC regulatory requirements and performance objectives under the packaging and transport SCA. CNSC staff monitored NB Power's performance through regular compliance verification activities.

Overall, NB Power's packaging and transport program meets regulatory requirements.

3.14.3.2 Regulatory Focus

CNSC staff will continue to provide regulatory oversight of shipments transported to and from the Point Lepreau NGS site to ensure regulatory requirements are met.

3.14.3.3 Proposed Improvements

Transport Canada has recently published a number of amendments to the [*Transportation of Dangerous Goods Regulations*](#). Although regulatory changes are minor, these revised regulations may have a small impact and NB Power will be required by CNSC staff to review its packaging and transport program to ensure continued compliance with the revised regulations.

3.14.4 Conclusion

Based on CNSC staff assessments of NB Power's licence application and past performance, NB Power maintains an effective packaging and transport program that meets regulatory requirements.

4. CONSULTATION AND ENGAGEMENT

The common-law duty to consult with Indigenous Nations and communities applies when the Crown contemplates actions that may adversely affect potential or established Indigenous and/or treaty rights. The CNSC ensures that all its licence decisions under the NSCA uphold the honour of the Crown and consider Indigenous peoples' potential or established Indigenous and/or treaty rights pursuant to section 35 of the Constitution.

CNSC staff make significant efforts to engage with members of the public and Indigenous Nations and communities on a routine basis. CNSC staff discuss regulatory matters with the local community on a quarterly basis and with each of three Indigenous Nations on a semi-annual basis.

4.1 Indigenous Consultation and Engagement

4.1.1 Discussion

CNSC staff have identified the First Nations who may have an interest in the proposed renewal of NB Power's Point Lepreau NGS PROL. These groups include six Maliseet communities in New Brunswick represented by the Wolastoqey Nation of New Brunswick (WNNB), nine Mi'kmaq communities in New Brunswick represented by Mi'gmawe'l Tplu'taqnn Incorporated (MTI), the Peskotomuhkati Nation, the Sipekne'katik First Nation in Nova Scotia, as well as the Kwilmu'kw Maw-klusuaqn (KMK), who represent the Mi'kmaq at the provincial level in Nova Scotia.

These groups were identified because they have expressed interest in being informed of CNSC licensing activities occurring in proximity to their traditional and/or treaty territories.

Following the 2017 licence renewal of the Point Lepreau NGS, CNSC staff have continued meeting with MTI, WNNB and the Peskotomuhkati Nations twice a year, and in some cases more frequently. These meetings are established as a mechanism for facilitating routine engagement on regulatory matters. This forum allows CNSC staff to provide regulatory updates and discuss key issues. CNSC staff also share information on specific topics that the Nations identify as being of interest, including early notification and discussions on the Point Lepreau NGS PROL renewal application and process. The meeting agenda is flexible and can be adapted based on the current needs identified by the Nations. CNSC staff intend to continue these routine engagement meetings throughout the proposed licence period.

CNSC staff have also conducted a number of collaborative activities with each of the 3 groups including facilitating a tour of the CNSC lab in Ottawa, collaborating on the Independent Environmental Monitoring Program (IEMP) to select appropriate samples, and visits to the Nations' communities, offices, and cultural centers.

In addition, CNSC staff and WNNB are working together to draft a Terms of Reference (TOR) for long-term and routine engagement that is meaningful. A TOR would outline the various areas and ways in which a Nation would like to engage with the CNSC and the methods that the CNSC will use to meet the identified needs. CNSC staff remain willing to establish a TOR with any other interested groups.

CNSC staff are committed to continuing our ongoing regular engagement with all Indigenous Nations and communities interested in the activities of the Point Lepreau NGS, regardless of whether there is an established TOR or not.

For the licence renewal application, CNSC staff sent letters of notification in July 2021 to the Indigenous Nations and communities who have expressed interest in receiving information. The letters provide information regarding the proposed licence renewal application, the availability of participant funding to facilitate participation in the licence renewal process, and details on how to participate in the Commission's public hearing process proposed for January and May 2022.

CNSC staff conducted follow-up phone calls with the identified groups in August 2021 to ensure they had received the letters of notification and to answer any questions about the regulatory process, how to get involved in the Commission proceedings, as well as on the participant funding opportunity through the CNSC's Participant Funding Program (PFP).

In October 2021, CNSC staff met with members of Wolastoqey Nation of New Brunswick and Peskotomuhkati Nation and in November the members of the Mi'gmawe'l Tplu'taqnn Inc. to discuss the licence renewal and the related

regulatory review process. CNSC staff answered all questions related to the current licence renewal application.

During our engagement sessions, CNSC staff have been made aware of specific concerns such as the impact of SMRs on environmental assessments and the relationship between the relicensing of the Point Lepreau NGS, the licence duration and a potential SMR new build. CNSC staff have clarified that the current relicensing application does not include any new build activities for SMRs. If NB Power decides to pursue the construction and operation of an SMR, they will be required to submit a new application to the Commission for decision.

CNSC staff note that there are no concerns that are directly related to the licence renewal application. CNSC staff are committed to continuing to address regulatory concerns and providing information.

CNSC [REGDOC-3.2.2, *Indigenous Engagement*](#), sets out requirements and guidance for 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 licensees to avoid, mitigate, or offset adverse impacts from the proposed licence renewal, may be used by CNSC staff in helping to meet its consultation obligations. The Point Lepreau NGS PROL renewal application does not raise the formal requirements of [REGDOC-3.2.2](#). However, CNSC staff recognize that NB Power has a well-established Indigenous engagement program in relation to the Point Lepreau NGS site and encourages NB Power to continue its engagement efforts in relation to the licence renewal and its ongoing operations at the Point Lepreau NGS site.

NB Power engagement

CNSC staff confirm that NB Power maintains on-going dialogue with First Nations consultative bodies and representatives with an interest in the Point Lepreau NGS, including the WNNB, MTI, the Peskotomuhkati Nation, Sipekne'katik First Nation, the Union of New Brunswick Indians and Mawiw Council through routinely scheduled meetings and responds to issues or concerns as they arise. Over the past year due to COVID, NB Power hosted virtual discussions with interested First Nations. They also, when possible, participated in face to face discussions, practicing physical distancing and wearing facial coverings.

In addition, CNSC staff have confirmed that NB Power employs First Nations field monitors to participate in all field related activities related to the monitoring of the Point Lepreau NGS site, and continues to implement a number of activities supporting Indigenous knowledge and establishing more awareness and sensitivity among its workers. Members of New Brunswick First Nation communities are invited to lead medicine walks, participate in regular activities at the site including collaborative environmental and safety monitoring and deliver presentations to leadership. CNSC staff observe that NB Power works with Indigenous Nations and communities and members of the public in their host community, through regular community liaison committee meetings, open houses,

quarterly newsletters, website updates and regular engagement with local fishing communities. CNSC staff notes that NB Power's regular engagement activities are an effort to build capacity within their communities to better understand nuclear technology and its use in New Brunswick, waste management principles and procedures, new opportunities in nuclear development, and its role in New Brunswick's electricity mix.

CNSC staff acknowledges that NB Power demonstrates and prioritizes their commitment to maintain their established relationships with First Nations communities and organizations and continually strives for improvement.

4.1.2 Conclusion

As NB Power's PROL renewal for the Point Lepreau NGS does not include any new activities that could cause new impacts on the environment, or changes in the ongoing licensed activities at the Point Lepreau NGS site, CNSC staff conclude that the licence renewal will not cause any new adverse impacts to any potential or established Indigenous and/or treaty rights.

CNSC staff conducted engagement activities with all identified Indigenous Nations and communities in relation to this PROL renewal application and is committed to meaningful, ongoing engagement with Indigenous Nations and communities that have an interest in CNSC regulated facilities and activities, including the Point Lepreau NGS.

4.2 Public Engagement

4.2.1 Discussion

The CNSC made funding available through its PFP to assist Indigenous Nations and communities, members of the public, and stakeholders in participating in the regulatory process for NB Power's proposed PROL renewal for the Point Lepreau NGS and to provide value-added information to the Commission through informed and topic-specific interventions. This funding was offered to review NB Power's licence application and associated documents and to prepare for, and participate in, the Commission's public hearing.

The Funding Review Committee (FRC) reviewed the applications received and made recommendations on the allocation of funding to eligible recipients. Based on the recommendations from the FRC, the CNSC awarded a total of \$176,741.98, in funding to the following recipients:

- Dr. Helmy Ragheb
- Gordon Dalzell
- Passamaquoddy Recognition Group Inc.
- Kopit Lodge
- Canadian Environmental Law Association
- Wolastoqey Nation in New Brunswick

- Mi'gmawe'l Tplu'taqnn Incorporated

In accordance with section 17 of the [Canadian Nuclear Safety Commission Rules of Procedure](#), a Notice of Public Hearing has been issued and posted on the CNSC website inviting written comments and requests for appearances before the Commission. CNSC staff also communicated information about the regulatory process for the renewal of NB Power's PROL to the public, stakeholders and Indigenous communities through various methods including feature articles, mail out flyers, graphics on the CNSC website, meetings, media and public webinars, and social media accounts.

4.2.2 Conclusion

CNSC staff continue to inform the public and Indigenous communities of our regulatory activities through regular website updates, publicly webcast Commission proceedings, social media, public webinars, mail out flyers and regular discussion with key audiences near the Point Lepreau NGS.

CNSC staff encourage the public and Indigenous communities to participate in the Commission's public hearing. The PFP was offered to assist interested members of the public, Indigenous peoples, and other stakeholders to prepare for and participate in the Commission's public hearing.

5. OTHER MATTERS OF REGULATORY INTEREST

5.1 Cost Recovery

It is a requirement of the NSCA under paragraph 24(2)(c), that the licence application be accompanied by the prescribed fee. The [Cost Recovery Fees Regulations](#) (CRFR) set out the specific requirements based on the activities to be licensed. An applicant for a Class I facility licence is subject to "Part 2" of CRFR, which is based on "Regulatory Activity Plan Fees".

5.1.1 Discussion

CNSC staff have determined that NB Power is in good standing with respect to CRFR requirements for the Point Lepreau NGS.

NB Power's licence renewal application for the Point Lepreau NGS is not a new application, and as such NB Power is not required to submit the initial fee of \$25,000 as described in paragraph 7(1)(a), which are only for new applicants. In this case, NB Power is subject to subsection 5(2), which relates to quarterly invoices sent to licensees.

5.1.2 Conclusion

After reviewing CNSC records, CNSC staff conclude NB Power is in good standing with respect to CRFR requirements for the Point Lepreau NGS. Based on NB Power's previous performance, there are no concerns regarding the payment of future cost recovery fees.

5.2 Financial Guarantees

A financial guarantee (FG) for decommissioning must be established to fund the activities described in the Preliminary Decommissioning Plan (PDP). The NSCA stipulates that the FG shall be in a form that is acceptable to the Commission. The NSCA and associated regulations require that licensees make adequate provision for the safe decommissioning of their facilities. Regulatory guidance and the associated acceptance criteria for establishing a FG is provided in the CNSC regulatory guide [G-206, *Financial Guarantees Guide for the Decommissioning of Licensed Activities*](#) including guidance on the attributes of an acceptable FG in terms of liquidity, certainty, adequacy of value and continuity.

5.2.1 Discussion

NB Power maintains a consolidated FG for decommissioning the Point Lepreau NGS site and SRWMF. The consolidated FG includes the following components:

- NB Power Decommissioning Fund – segregated fund for Point Lepreau NGS and SRWMF decommissioning
- NB Power Used Fuel Management Fund – segregated fund for used fuel management
- NB Power Nuclear Fuel Waste Act Trust - the trust fund for the management of used fuel established pursuant to the *Nuclear Fuel Waste Act*

As per regulatory requirements, NB Power submitted its revised PDP, estimated decommissioning costs, and proposed FG to the CNSC in June 2020 [147]. The previous submissions by NB Power was accepted by the Commission in 2016 [148].

In April 2020, in addition to the requirement to submit an annual report on the status of its FG, CNSC staff issued to NB Power a binding request pursuant to subsection 12(2) of the [General Nuclear Safety and Control Regulations](#) to report quarterly on the current value of their FG and confirm that it remains sufficient to cover their decommissioning liability [149]. CNSC staff confirmed that NB Power complied with the binding request.

The request was made to NB Power, as well as other licensees, due to the potential for market fluctuations during the early stages of the COVID-19 pandemic. Due to market stability, CNSC staff sent a follow-up letter to NB Power in September 2021, stating that quarterly reporting on the status of the Point Lepreau NGS financial guarantee is no longer needed [150].

In accordance with licence condition G.5 of the Point Lepreau NGS PROL, NB Power is required to maintain an FG for decommissioning that is acceptable to the Commission. As per section G.5 of the LCH, NB Power is required on a 5-year basis to review its PDP and associated FG and submit to the Commission a written report confirming that the FG for decommissioning costs remains valid and sufficient to meet the decommissioning needs.

Based on NB Power's 5-year review of its PDP and associated FG submitted in June 2020 [151], the total value of NB Power's FG was \$755.0 million against a funding requirement of \$714.5 million [147]. CNSC staff have reviewed NB Power's 5-year review of its PDP and associated FG for the Point Lepreau NGS and SRWMF facility and found it to be acceptable.

CNSC staff recommend that the Commission accept NB Power's 2020 submission of its revised PDP and associated FG.

5.2.2 Conclusion

CNSC staff conclude that NB Power has a valid and acceptable FG for decommissioning costs in place and that NB Power met all reporting requirements throughout the licensing period.

5.2.3 Recommendation

CNSC staff are recommending the Commission accept NB Power's 2020 submission of the PDP and associated FG.

Licence condition G.5 currently in the PROL, requires that the licensee maintain a FG for decommissioning that is acceptable to the Commission. CNSC staff recommend that this condition remain in the proposed licence.

Compliance verification criteria for this licence condition is included in Section G.5 of the draft LCH.

5.3 Fisheries Act Authorization

The process for obtaining a Fisheries Act authorization is separate from the CNSC licence renewal process, as they are covered by different legislation. The Fisheries Act uses a different test than the environmental protection requirements of the NSCA and Canadian Environmental Assessment Act of 2012.

The purpose of the Fisheries Act is to provide a framework for the proper management and control of fisheries; and the conservation and protection of fish and fish habitat, including by preventing pollution.

In a memorandum of understanding signed between CNSC and the DFO outlining areas for cooperation and administration of the Fisheries Act, DFO remains accountable for issuing Fisheries Act authorizations including approving any offset measures.

5.3.1 Discussion

According to the provisions of the Fisheries Act, NB Power submitted a preliminary self-assessment of serious harm to fish from cooling-water intake in early 2016 to CNSC staff. CNSC staff review concluded that an authorization was required in accordance with subsection 35(1) of the Fisheries Act. The Department of Fisheries and Oceans Canada (DFO) concurred with CNSC staff's conclusion. NB Power submitted a partial draft of a Fisheries Act application to CNSC staff in March 2018, followed by another draft application in December 2018.

In June 2019, NB Power informed CNSC staff that it would proceed with a new offsetting strategy in the form of a dam removal. This strategy will serve as an offset measure for Point Lepreau NGS and three other NB Power owned, non-nuclear facilities [152].

NB Power submitted an application for a fisheries act authorization (FAA) to DFO in June 2019, which was deemed incomplete by DFO in August 2019. NB Power resubmitted a revised application for a FAA to DFO in October 2019, and in December 2019 DFO deemed NB Power's application for a FAA to be complete.

Although the application was deemed complete, the 90-day limit within which a decision on the application must be made is currently on hold until Indigenous consultation requirements are met. DFO's decision regarding the authorization will be made within 90 days following the completion of Indigenous consultation.

CNSC staff note that NB Power's proposed FAA offset project is also undergoing a provincial environmental assessment (EA). DFO will consider the results of the provincial EA and the Indigenous consultation prior to making a decision.

5.3.2 Conclusion

CNSC staff conclude that NB Power has followed the process to apply for a Fisheries Act Authorization.

The issuance of a licence under the NSCA is not contingent on a licensee having a Fisheries Act Authorization. However, it is the duty of the licensee to ensure that they are in compliance with other Acts of Parliament.

5.4 Licensee Public Information Program

A Public Information and Disclosure Program (PIDP) is a regulatory requirement for licence applicants and licensees of Class I nuclear facilities, uranium mines and mills and certain Class II nuclear facilities. These requirements are found in [REGDOC-3.2.1, *Public Information and Disclosure*](#).

The primary goal of the PIDP is to ensure that information related to the health, safety and security of persons and the environment, and other issues associated with the lifecycle of nuclear facilities are effectively communicated to the public.

The program must include a commitment to, and protocol for, ongoing and timely communication of information related to the licensed facility during the licence period.

CNSC staff have confirmed that NB Power maintains an approved PIDP for the Point Lepreau NGS. CNSC staff have noted that through ongoing updates to their PIDP, NB Power has demonstrated its commitment to disseminating appropriate and timely health and safety information to the public through face-to-face and virtual meetings, NB Power's website and social media, and playing an active role in the community, including conducting community surveys on a regular basis.

5.4.1 Discussion

NB Power is required under its licence to maintain a PIDP for the Point Lepreau NGS, as per [REGDOC-3.2.1, Public Information and Disclosure](#).

CNSC staff have reviewed NB Power's PIDP and determined that it:

- identifies clear goals and objectives in terms of the dissemination of information to three levels of target audiences, including the local community of Maces Bay and surrounding areas, the broader public of New Brunswick and local Indigenous communities
- is available to the public and is posted on NB Power's website
- provides information on the facility operations, health and safety, and environmental monitoring

Point Lepreau NGS's audiences are kept informed in a variety of ways including:

- community information sessions, technical briefings, regular participation in community activities, social and traditional media, and NB Power's website
- targeting multiple audiences including the impacted communities as well as the broader regions and Indigenous communities
- providing contact information for those who want to obtain additional information

Improvements to PIDP during the current licensing period

NB Power conducts periodic public opinion surveys to help gain insight into specific community interests based on the geographical distribution of the population of New Brunswick. The data collected serves as an important input to identify topic areas of interest among the distributed population and to support incorporating modern communication practices.

Communication products are created and distributed to local audiences in English and French.

CNSC staff have confirmed that throughout the current licensing period, NB Power staff visited local communities regularly, hosted open houses and participated in community-led events. Since the beginning of the global pandemic in March 2020, NB Power offered virtual meetings with local communities given the COVID-19 restrictions. NB Power representatives use these opportunities to share information about ongoing and upcoming activities.

The use of social media has evolved significantly during the current licensing period and NB Power representatives use these opportunities to share information about ongoing and upcoming activities. During the current licensing period, NB Power has increased its online presence through the use of the NB Power accounts, adding platforms and targeted messages through the appropriate social media channels for its audiences. As identified in NB Power's audience polling, using a variety of social media platforms is beneficial to communicate directly to

some primary audiences and NB Power uses these tools to monitor its public environment.

5.4.2 Conclusion

CNSC staff conclude that NB Power's PIDP for Point Lepreau NGS meets the regulatory requirements for public information and disclosure. CNSC staff continue to oversee the implementation of the PIDP to ensure that it meets obligations regarding disseminating information and notifying its target audiences of operational changes, and impacts on health, safety and the environment specific to its licensed activities.

CNSC staff also encourage NB Power to update its PIDP with changes to the Point Lepreau NGS activities and conduct thorough evaluations on a regular basis to ensure it continues to meet the needs of the target audiences.

5.4.3 Recommendation

NB Power is encouraged to complete more frequent reviews and update its Point Lepreau NGS PIDP to adapt communications programming to suit the needs of its multiple audiences.

CNSC staff also expect NB Power to conduct a yearly review of the disclosure protocol with its local community to ensure the commitment maintains relevance and importance to their audiences.

5.5 Nuclear Liability Insurance

The *Nuclear Liability and Compensation Act* (NLCA), which came into force on January 1, 2017, requires nuclear installations to carry financial security for third-party (civil) liability in the event of a nuclear incident as defined under section 2 of the NLCA.

The NLCA is administered by Natural Resources Canada (NRCan). The Point Lepreau NGS site is currently designated, pursuant to section 7 of the NLCA, as a nuclear installation in Item 5, Column 1 of the Schedule of the [Nuclear Liability and Compensation Regulations](#) (NLCR).

5.5.1 Discussion

The Point Lepreau NGS installation contains two facilities that are authorized to contain nuclear material as defined in the NLCA, that is, a single-unit power reactor facility and a solid radioactive waste management facility. These facilities are listed in item 5, column 4 in the Schedule of the NLCR. Section 4 of the NLCR describes classes of nuclear installations and ranks the risk of each class. Because the single-unit power reactor facility is the facility with the highest risk, the Point Lepreau NGS installation falls under the "Power Reactor Class" pursuant to paragraph 4(2)(a) of the NLCR, and NB Power's liability amount is prescribed at 1 billion dollars pursuant to paragraph 24(1)(d) of the NLCA.

5.5.2 Conclusion

CNSC staff have confirmed with NRCAN staff that, as of December 23rd 2021, NB Power is in compliance with its obligation under the NLCA and has the requisite third-party (civil) liability financial security for the Point Lepreau NGS.

5.6 Nuclear Substances and Prescribed Equipment

Nuclear substances and prescribed equipment at the Point Lepreau NGS are governed by a consolidated PROL, which is consistent with the other NPPs in Canada.

NB Power is licensed to possess, transfer, import, use, package, manage and store nuclear substances and prescribed equipment as indicated in section IV, Licensed Activities, of the current PROL. These items require licensing as the activity possessed exceeds the exemption quantity as specified under the [Nuclear Substances and Radiation Devices Regulations](#).

Prior to consolidation, NB Power held a separate CNSC Nuclear Substances and Radiation Devices licence.

5.6.1 Discussion

Unsealed sources listed in section 16.1, *Nuclear Substances and Prescribed Equipment*, of the Point Lepreau NGS LCH [14] support the maintenance and calibration of radiation detection and measurement equipment.

The prescribed equipment/radiation devices listed under section 16.1 of the Point Lepreau NGS LCH [14] have been certified by CNSC staff for use in Canada and as a function of the certification are intrinsically safe with minimal exposure to persons working in the vicinity when used properly. These radiation devices and associated sealed sources are used in the calibration of equipment and to assure the proper functioning of monitoring equipment.

NB Power submits Annual Compliance Reports on Nuclear Substances and Radiation Devices, listing the activities conducted with the sources, purchases and disposals, and a closing inventory of sources and devices.

CNSC staff note that the detailed compliance verification criteria are included in the current operating licence and will be removed from the proposed licence to further align with other NPP consolidated PROLs. The more comprehensive compliance verification criteria are now included in the proposed LCH. These criteria contain the same content as the licence conditions that existed in NB Power's Nuclear Substances and Radiation Devices licence prior to its consolidation into the PROL.

5.6.2 Compliance

CNSC staff conducted a field inspection of the consolidated use of nuclear substances on March 31 and April 15, 2021. CNSC staff identified findings of negligible safety significance related to procedures and records [153]. NB Power

implemented corrective actions to clarify the retention period of forms. CNSC staff determined the corrective actions to be acceptable.

5.6.3 Conclusion

The use of nuclear substances and radiation devices at the Point Lepreau NGS by NB Power is within its licensing basis and complies with regulatory requirements.

5.7 Closure of Fukushima Action Items

In 2016, CNSC staff concluded that NB Power strengthened the reactor defence-in-depth and enhanced its emergency response capability at Point Lepreau NGS as a result of the lessons learned from the Fukushima Daiichi nuclear accident. CNSC staff closed the last Fukushima action item (FAI) issued to NB Power on April 21, 2016 [154]. CNSC staff opened six (6) station-specific actions as a follow-up to the closure of the FAIs. During the current licensing term CNSC staff closed all of the station-specific actions at Point Lepreau NGS [155][156][157][158][159][160].

5.8 Delegation of Authority

The Commission has the authority to issue licences as per subsection 24(2) of the NSCA. A PROL is a Class IA licence under Part IV of the CNSC classes of licences and can only be issued by the Commission. However, the Commission can delegate certain consent approvals to another person, permitting them to oversee changes to licensed activities, facilities and operations that are governed by licence conditions and are within the licensing basis.

There are 2 proposed licence conditions in the Point Lepreau NGS PROL that contain the phrase “a person authorized by the Commission”:

- LC 3.2 - The licensee shall not restart a reactor after a serious process failure without the prior written approval of the Commission, or the prior written consent of a person authorized by the Commission.
- LC 15.2 - The licensee shall obtain written approval of the Commission, or consent of a person authorized by the Commission prior to the start of operations at the Phase II Extension of the SRWMF.

CNSC staff recommend that the Commission delegate authority to the following staff to make decisions falling under licence conditions 3.2 and 15.2:

- Director, Gentilly-2/Point Lepreau Regulatory Program Division
- Director General, Directorate of Power Reactor Regulation
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch

Additional information on the proposed licence conditions subject to a delegation of authority are provided in the proposed LCH which is included in Part 2 of this CMD.

6. OVERALL CONCLUSIONS AND RECOMMENDATIONS

CNSC staff reviewed NB Power's licence application and supporting documents and determined that NB Power's application meets regulatory requirements and establishes an adequate licensing basis for continued operation.

CNSC staff assessed NB Power's performance during the current licence term and confirmed that they demonstrated stable safety performance that was satisfactory.

CNSC staff also confirmed that there were no major gaps identified in the periodic safety review and that NB Power will continue to implement safety enhancements, as outlined in the integrated implementation plan, to continuously maintain the plant in a state that is comparable to a new plant.

With respect to paragraphs 24(4)(a) and (b) of the NSCA, CNSC staff find that the applicant provided adequate evidence that NB Power:

1. is qualified to carry on the activity authorized by the licence
2. 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

Therefore, CNSC staff recommend that the Commission:

1. renew the Point Lepreau NGS PROL, authorizing NB Power to carry out the licenced activities listed in Part IV of the proposed licence for 20 years from July 1, 2022 to June 30, 2042
2. accept NB Power's 2020 Preliminary Decommissioning Plans and associated Financial Guarantee
3. delegate the authority to CNSC staff as set out in section 5.8 of this CMD

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142. Letter from J. Burta to B. Plummer, Point Lepreau: CNSC Type II Inspection Report: GPLRPD-2019-003- Solid Radioactive Waste Management Facility, June 1, 2019, e-Doc 5913694
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160. Letter from J. Burta to B. Plummer, CNSC Staff Review of NB Power Commitments Related to Closed FAI 1.9.1 – AI 151211 Closure Request and Update for the CNSC Regulatory Documents and CSA Standards Implementation Plans for the PLNGS Licensing Basis, April 25, 2019, e-Doc 5888249

GLOSSARY

Acronym	Term
Ac-228	Actinium
ACR	Annual Compliance Reports
AECB	Atomic Energy and Control Board
AF	Accident Frequency
AIA	Authorized Inspection Agency
ALARA	As Low as Reasonably Achievable
APOP	Abnormal Plant Operating Procedures
ASR	Accident Severity Rate
BATEA	Best Available Technology and Techniques, Economically Achievable
BDBA	Beyond Design Basis Accident
BE	Below Expectations
Be-7	Beryllium
BOP	Balance of Plant
C-14	Carbon-14
CAA	Composite Analysis Approach
CANDU	Canada Deuterium Uranium
CAS	Central Alarm Station
CBOP	Continuous Behaviour Observation Program
CCR	Code Compliance Review
CCW	Condenser Cooling Water
CEPA	Canadian Environmental Protection Act
CMD	Commission Member Document
CNSC	Canadian Nuclear Safety Commission
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
Co-60	Cobalt-60
COG	CANDU Owners Group
CRE	Collective Radiation Exposure

CRFR	<i>Cost Recovery Fees Regulations</i>
CRO	Control Room Operator
CROIT	Control Room Operator in Training
CRO/SS	Control Room Operator and Shift Supervisors
CRT	COVID Response Team
Cs-137	Cesium
CSA	Canadian Standards Association
CSI	CANDU Safety Issue
DBT	Design Basis Threat
DFO	Fisheries and Oceans Canada
DRL	Derived Release Limit
EA	Environmental Assessment
EcoRA	Ecological Risk Assessment
EDG	Emergency Diesel Generators
EIR	Event Initial Report
EITER	Equipment Important to Emergency Response
EME	Emergency Mitigating Equipment
EMP	Environmental Monitoring Program
EMS	Environmental Management System
EOC	Emergency Operations Centre
EOP	Emergency Operating Procedures
EPP	Equipment Program Plan
EPR	Environmental Protection Review
EPREV	Emergency Preparedness Review
EPRR	Environmental Protection Review Report
EPS	Electrical Power Systems
EQ	Environmental Qualification
ERA	Environmental Risk Assessment
ERRIS	Effluent Regulation Reporting Information System
ERT	Emergency Response Team
FAA	<i>Fisheries Act Authorization</i>

FG	Financial Guarantee
FHA	Fire Hazard Assessment
FIRS	Foundation Input Response Spectra
FRC	Funding Review Committee
FS	Fully Satisfactory
FSSA	Fire Safe Shutdown Analysis
GAR	Global Assessment Report
GEM	Gaseous Effluent Monitor
GHG	Greenhouse Gas Emission
GNSCR	<i>General Nuclear Safety and Control Regulations</i>
H-3	Tritium
HEL	High Energy Line
HHRA	Human Health Risk Assessment
HPP	Human Performance Program
IAA	<i>Impact Assessment Act</i>
IAEA	International Atomic Energy Agency
ICS	Incident Command Section
I&C	Instrumentation and Control
IEMP	Independent Environmental Monitoring Program
IIP	Integrated Implementation Plan
ISAR	Industrial Safety Accident Rate
K-40	Potassium
KMK	Kwilmu'kw Maw-klusuaqn
LCH	Licence Conditions Handbook
LCMP	Life Cycle Management Plan
LEM	Liquid Effluent Monitor
LLOCA+LOECC	Large Loss of Coolant Accident and Loss of Emergency Core Cooling
LOF	Loss of Flow
LORC	Loss of Reactivity Control
LTAM	Long Term Asset Management
MSC	Minimum Shift Complement

MSL	Mean Sea Level
mSv	Millisievert
MTI	Mi'gmawe'l Tplu'taqnn Incorporated
MWe	Megawatts
NB	New Brunswick
NBDELG	New Brunswick Department of Environment and Local Government
NBDPS	New Brunswick Department of Public Safety
NBEMO	New Brunswick Emergency Measures Organization
NB Power	New Brunswick Power
NEW	Nuclear Energy Worker
NFPA	National Fire Protection Association
NGS	Nuclear Generating Station
NLCA	<i>Nuclear Liability and Compensation Act</i>
NMAR	Nuclear Material Accounting Reporting
NPRI	National Pollutant Release Inventory
NO ₂	Nitrogen Dioxide
NPP	Nuclear Power Plant
NPT	<i>Treaty on the Non-Proliferation of Nuclear Weapons</i>
NRCan	Natural Resources Canada
NRF	Nuclear Response Force
NSCA	<i>Nuclear Safety and Control Act</i>
NSR	<i>Nuclear Security Regulations</i>
OEOC	Off-Site Emergency Operations Centre
OHSA	<i>Occupational Health and Safety Act</i>
OPEX	Operating Experience
OP&Ps	Operating Policies and Principles
PCE	Personnel Contamination Event
PDP	Preliminary Decommissioning Plan
PFP	Participant Funding Program
PFU	Predicted Future Unavailability
PHT	Primary Heat Transport

PIDP	Public Information and Disclosure Program
PIP	Periodic Inspection Plan
PIR	Problem Identification and Resolution
PM	Particulate Matter
PMCR	Preventive Maintenance Completion Ratio
PROL	Power Reactor Operating Licence
PSA	Probabilistic Safety Assessment
PSR	Periodic Safety Review
PSR2	Periodic Safety Review #2
PTHA	Probabilistic Tsunami Hazard Assessment
RBMP	Reactor Building Management Plan
RCMP	Royal Canadian Mounted Police
R&D	Research and Development
REMP	Radiation Environmental Protection Program
RP	Radiation Protection
SA	Satisfactory
SAM	Severe Accident Management
SAMG	Severe Accident Management Guidelines
SAT	Systematic Approach to Training
SCA	Safety and Control Area
SCTs	Safety Critical Targets
SHP	Senior Health Physicist
SIS	Systems Important to Safety
SLOCA	Small Loss of Coolant Accident
SO ₂	Sulphur Dioxide
SOE	Safe Operating Envelope
SPI	Safety Performance Indicator
SR	Safety Report
SRWMF	Solid Radioactive Waste Management Facility
SS	Shift Supervisors
SSC	Structures, Systems and Components

SST	Station Service Transformer
TLD	Thermoluminescent Dosimeter
ToR	Terms of Reference
TPR	Third Party Review
TRA	Threat and Risk Assessment
VOC	Volatile Organic Compounds
VP	Vice President
WBC	Whole Body Counts
WNNB	Wolastoqey Nation of New Brunswick

A. RISK RANKING

The CNSC uses a risk-informed regulatory approach in the management and control of regulated facilities and activities. CNSC staff have therefore established an approach to identifying appropriate levels of regulatory monitoring and control for specific classes of licensed facilities and types of licensed activities based on risk ranking.

Risk ranking is applied to each SCA and is determined by considering the probability and consequence of adverse incidents associated with each SCA as it relates to the given facility and activity types.

The methodology used to determine risk ranking is based on Canadian Standards Association guideline CAN/CSA-Q850, Risk Management: Guideline for Decision Makers. This guideline provides a description of the major components of the risk management decision process and their relationship to each other, and describes a process for acquiring, analyzing, evaluating, and communicating information that is necessary for making decisions.

In section 2.2 of the CMD, in the Relevant Safety Control Areas table, the “Risk Ranking” column shows a high (H), moderate (M) or low (L) indicator for each SCA that is relevant to the current facility and activities being addressed in this CMD. The risk rankings are not static and will change over time for a given facility and activities (e.g., facilities age, facilities and equipment are upgraded, activities cease or begin, licensees change, technology and programs mature, knowledge and understanding of impacts and probabilities increase, etc.).

The following matrix provides a high-level overview of risk ranking, and the management and monitoring approach associated with the various degrees of risk.

APPROACH TO ASSESSING AND MANAGING POTENTIAL RISK			
CONSEQUENCE	MANAGEMENT/MONITORING APPROACH		
Significant Impact	Considerable management of risk is required	Must manage and monitor risk with occasional control	Extensive management is essential. Constant monitoring and control
Moderate Impact	Occasional monitoring	Management effort is recommended	Management effort and control is required
Low Impact	Random monitoring	Regular monitoring	Manage and monitor
Probability of Occurrence	Unlikely to Occur	Might Occur	Expected to Occur

RISK RANKING SCALE		
L	Low Risk	M Moderate Risk H High Risk

On this basis, a high-risk SCA would be subject to increased regulatory scrutiny and control while a low-risk SCA would generally require minor verification and control.

B. RATING LEVELS

Fully Satisfactory (FS)

Safety and control measures implemented by the licensee are highly effective. In addition, compliance with regulatory requirements is fully satisfactory, and compliance within the safety and control area (SCA) or specific area exceeds requirements and CNSC expectations. Overall, compliance is stable or improving, and any problems or issues that arise are promptly addressed.

Satisfactory (SA)

Safety and control measures implemented by the licensee are sufficiently effective. In addition, compliance with regulatory requirements is satisfactory. Compliance within the SCA meets requirements and CNSC expectations. Any deviation is minor, and any issues are considered to pose a low risk to the achievement of regulatory objectives and CNSC expectations. Appropriate improvements are planned.

Below Expectations (BE)

Safety and control measures implemented by the licensee are marginally ineffective. In addition, compliance with regulatory requirements falls below expectations. Compliance within the SCA deviates from requirements or CNSC expectations to the extent that there is a moderate risk of ultimate failure to comply. Improvements are required to address identified weaknesses. The licensee is taking appropriate corrective action.

Unacceptable (UA)

Safety and control measures implemented by the licensee are significantly ineffective. In addition, compliance with regulatory requirements is unacceptable and is seriously compromised. Compliance within the SCA is significantly below requirements or CNSC expectations, or there is evidence of overall non-compliance. Without corrective action, there is a high probability that the deficiencies will lead to unreasonable risk. Issues are not being addressed effectively, no appropriate corrective measures have been taken and no alternative plan of action has been provided. Immediate action is required.

C. SAFETY AND CONTROL AREA FRAMEWORK

C.1 Definition of Safety and Control Areas

The safety and control areas identified in section 2.2 and discussed in the summary in sections 3.1 through 3.14 are comprised of specific areas of regulatory interest which vary between facility types.

The following table provides a high-level definition of each SCA. The specific areas within each SCA are identified in the respective areas within section 3 and in the table in section D.2.

SAFETY AND CONTROL AREA FRAMEWORK		
Functional Area	Safety and Control Area	Definition
Management	Management System	Covers the framework which establishes the processes and programs required to ensure an organization achieves its safety objectives and continuously monitors its performance against these objectives and fostering a healthy safety culture.
	Human Performance Management	Covers activities that enable effective human performance through the development and implementation of processes that ensure that licensee staff is sufficient in number in all relevant job areas and that licensee staff have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.
	Operating Performance	This includes an overall review of the conduct of the licensed activities and the activities that enable effective performance.
Facility and equipment	Safety Analysis	Maintenance of the safety analysis that supports that 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 preventative measures and strategies in reducing the effects of such hazards.

SAFETY AND CONTROL AREA FRAMEWORK		
Functional Area	Safety and Control Area	Definition
	Physical Design	Relates to activities that impact on the ability of systems, components, and structures to meet and maintain their design basis given new information arising over time and taking changes in the external environment into account.
	Fitness for Service	Covers activities that impact on the physical condition of systems, components, and structures to ensure that they remain effective over time. This includes programs that ensure all equipment is available to perform its intended design function when called upon to do so.
Core control processes	Radiation Protection	Covers the implementation of a radiation protection program in accordance with the RP Regulations. This program must ensure that contamination levels and radiation doses received by individuals are monitored, controlled, and maintained ALARA.
	Conventional Health and Safety	Covers the implementation of a program to manage workplace safety hazards and to protect personnel and equipment.
	Environmental Protection	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.
	Emergency Management and Fire Protection	Covers emergency plans and emergency preparedness programs which exist for emergencies and for non-routine conditions. This also includes any results of exercise participation.
	Waste Management	Covers internal waste-related programs which 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. Also covers the planning for decommissioning.

SAFETY AND CONTROL AREA FRAMEWORK		
Functional Area	Safety and Control Area	Definition
	Security	Covers the programs required to implement and support the security requirements stipulated in the regulations, in their licence, in orders, or in expectations for their facility or activity.
	Safeguards and Non-Proliferation	Covers the programs and activities required for the successful implementation of the obligations arising from the Canada/IAEA safeguards agreements as well as all other measures arising from the <i>Treaty on the Non-Proliferation of Nuclear Weapons</i> .
	Packaging and Transport	Programs that cover the safe packaging and transport of nuclear substances and radiation devices to and from the licensed facility.

C.2 Specific Areas for Nuclear Power Plants

The following table identifies the specific areas that comprise each SCA for NPPs:

Table D.2: Specific areas for nuclear power plants

SPECIFIC AREAS FOR NUCLEAR POWER PLANTS		
Functional Area	Safety and Control Area	Specific Areas
Management	Management System	<ul style="list-style-type: none"> ▪ Management System ▪ Organization ▪ Performance Assessment, Improvement and Management Review ▪ Operating Experience (OPEX) ▪ Change Management ▪ Safety Culture ▪ Configuration Management ▪ Records Management ▪ Management of Contractors ▪ Business Continuity
	Human Performance Management	<ul style="list-style-type: none"> ▪ Human Performance Programs ▪ Personnel Training ▪ Personnel Certification ▪ Work Organization and Job Design ▪ Fitness for Duty
	Operating Performance	<ul style="list-style-type: none"> ▪ Conduct of Licensed Activity ▪ Procedures ▪ Reporting and Trending ▪ Outage Management Performance ▪ Safe Operating Envelope ▪ Severe Accident Management and Recovery ▪ Accident Management and Recovery
Facility and Equipment	Safety Analysis	<ul style="list-style-type: none"> ▪ Deterministic Safety Analysis ▪ Hazard Analysis ▪ Probabilistic Safety Analysis ▪ Criticality Safety

SPECIFIC AREAS FOR NUCLEAR POWER PLANTS		
Functional Area	Safety and Control Area	Specific Areas
		<ul style="list-style-type: none"> ▪ Severe Accident Analysis ▪ Management of Safety Issues (including R&D Programs)
	Physical Design	<ul style="list-style-type: none"> ▪ Design Governance ▪ Site Characterization ▪ Facility Design ▪ Structure Design ▪ System Design ▪ Components Design
	Fitness for Service	<ul style="list-style-type: none"> ▪ Equipment Fitness for Service/Equipment Performance ▪ Maintenance ▪ Structural Integrity ▪ Aging Management ▪ Chemistry Control ▪ Periodic Inspection and Testing
Core Control Processes	Radiation Protection	<ul style="list-style-type: none"> ▪ Application of ALARA ▪ Worker Dose Control ▪ Radiation Protection Program Performance ▪ Radiological Hazard Control
	Conventional Health and Safety	<ul style="list-style-type: none"> ▪ Performance ▪ Practices ▪ Awareness
	Environmental Protection	<ul style="list-style-type: none"> ▪ Effluent and Emissions Control (releases) ▪ Environmental Management System (EMS) ▪ Assessment and Monitoring ▪ Protection of People ▪ Environmental Risk Assessment
	Emergency Management and Fire Protection	<ul style="list-style-type: none"> ▪ Conventional Emergency Preparedness and Response

SPECIFIC AREAS FOR NUCLEAR POWER PLANTS		
Functional Area	Safety and Control Area	Specific Areas
		<ul style="list-style-type: none"> ▪ Nuclear Emergency Preparedness and Response ▪ Fire Emergency Preparedness and Response
	Waste Management	<ul style="list-style-type: none"> ▪ Waste Characterization ▪ Waste Minimization ▪ Waste Management Practices ▪ Decommissioning Plans
	Security	<ul style="list-style-type: none"> ▪ Facilities and Equipment ▪ Response Arrangements ▪ Security Practices ▪ Drills and Exercises ▪ cyber security
	Safeguards and Non-Proliferation	<ul style="list-style-type: none"> ▪ Nuclear Material Accountancy and Control ▪ Access and Assistance to the IAEA ▪ Operational and Design Information ▪ Safeguards Equipment, Containment and Surveillance ▪ Import and Export
	Packaging and Transport	<ul style="list-style-type: none"> ▪ Package Design and Maintenance ▪ Packaging and Transport ▪ Registration for Use

PART TWO

PROPOSED LICENCE CHANGES

Overview

There are minor changes to the licence conditions and no changes to the format. The proposed licence contains standard licence conditions and the recommended licence term is for a 20-year period. The proposed licence does not contain any new licence conditions.

Licence Conditions

The proposed licence removes licence condition 3.4 that required NB Power to conduct a periodic safety review prior to the next licence renewal. The requirement to conduct a PSR every 10 years and implement the associated Integrated Implementation Plan was moved to the licence conditions handbook as compliance verification criteria under the operating performance safety and control area and is associated with licence condition 3.1.

The requirement for NB Power to implement and maintain a program for nuclear substances and prescribed equipment remains in the proposed licence; however, details regarding the types of isotopes have been moved to the licence conditions handbook to better align with other nuclear power plant PROLs.

Additionally, there have been some minor modifications to the licence conditions to improve clarity and for consistency with standardized licence conditions.

Licence Format

No changes are proposed to the licence format

Licence Period

CNSC staff are recommending a 20-year licence period. A full discussion of the rationale in support of this recommendation can be found in section 2.7 of this CMD.

PROPOSED LICENCE



NUCLEAR POWER REACTOR OPERATING LICENCE

POINT LEPREAU NUCLEAR GENERATING STATION

- I) LICENCE NUMBER:** **PROL 22.00/2042**
- II) LICENSEE:** Pursuant to section 24 of the [Nuclear Safety and Control Act](#) this licence is issued to:
- New Brunswick Power Corporation**
515 King Street
Fredericton, New Brunswick
E3B 5G4
- III) LICENCE PERIOD:** This licence is valid from July 1, 2022 to June 30, 20XX, unless suspended, amended, revoked or replaced.
- IV) LICENSED ACTIVITIES:**
This licence authorizes the licensee to:
- (i) operate the Point Lepreau Nuclear Generating Station (hereinafter “the nuclear facility”) and the Point Lepreau Solid Radioactive Waste Management Facility (hereinafter “the waste storage facility”) at a site located in Charlotte County and Saint John County, Province of New Brunswick;
 - (ii) possess, transfer, use, package, manage and store the nuclear substances, that are required for, associated with, or arise from the activities described in (i);
 - (iii) possess, transfer, import, use, package, manage and store the sealed and unsealed sources and the prescribed equipment;
 - (iv) transport Category II nuclear material by road vehicle from the nuclear facility spent fuel bay to the onsite waste storage facility; and
 - (v) possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i), (iii) and (iv).

V) EXPLANATORY NOTES:

- (i) Nothing in this licence shall be construed to authorize non-compliance with any other applicable legal obligation or restriction.
- (ii) Unless otherwise provided for in this licence, words and expressions used in this licence have the same meaning as in the [Nuclear Safety and Control Act](#) and associated Regulations.
- (iii) The [POINT LEPREAU NGS LICENCE CONDITIONS HANDBOOK \(LCH\)](#) provides compliance verification criteria used to verify compliance with the conditions in the licence. The LCH also provides information regarding delegation of authority, applicable versions of documents and non-mandatory guidance on how to achieve compliance.

VI) CONDITIONS:**G. General**

- G.1 The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:
 - (i) the regulatory requirements set out in the applicable laws and regulations;
 - (ii) the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence;
 - (iii) the safety and control measures described in the licence application and the documents needed to support that licence application;unless otherwise approved in writing by the Canadian Nuclear Safety Commission (CNSC, hereinafter "the Commission").
- G.2 The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs, and methods referred to in the licensing basis.
- G.3 The licensee shall control the use and occupation of any land within the exclusion zone.
- G.4 The licensee shall provide, at the nuclear facility and at no expense to the Commission, suitable office space for employees of the Commission who customarily carry out their functions on the premises of that nuclear facility (onsite Commission staff).
- G.5 The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission.
- G.6 The licensee shall implement and maintain a public information and disclosure program.

1. Management System

1.1 The licensee shall implement and maintain a management system.

2. Human Performance Management

2.1 The licensee shall implement and maintain a human performance program.

2.2 The licensee shall implement and maintain the minimum shift complement and control room staffing for the PLNGS.

2.3 The licensee shall implement and maintain training programs for workers.

2.4 The licensee shall implement and maintain certification programs in accordance with CNSC regulatory document [REGDOC-2.2.3, PERSONNEL CERTIFICATION, VOLUME III: CERTIFICATION OF PERSONS WORKING AT NUCLEAR POWER PLANTS.](#)

Persons appointed to the following positions require certification:

- (i) Senior Health Physicist;
- (ii) Shift Supervisor; and
- (iii) Control Room Operator.

3. Operating Performance

3.1 The licensee shall implement and maintain an operations program, which includes a set of operating limits.

3.2 The licensee shall not restart a reactor after a serious process failure without the prior written approval of the Commission, or prior written consent of a person authorized by the Commission.

3.3 The licensee shall notify and report in accordance with CNSC regulatory document [REGDOC-3.1.1 REPORTING REQUIREMENTS: NUCLEAR POWER PLANTS.](#)

4. Safety Analysis

4.1 The licensee shall implement and maintain a safety analysis program.

5. Physical Design

5.1 The licensee shall implement and maintain a design program.

5.2 The licensee shall implement and maintain a pressure boundary program and have in place a formal agreement with an Authorized Inspection Agency.

5.3 The licensee shall implement and maintain an equipment and structure qualification program.

6. Fitness for Service

6.1 The licensee shall implement and maintain a fitness for service program.

7. Radiation Protection

7.1 The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

8. Conventional Health and Safety

8.1 The licensee shall implement and maintain a conventional health and safety program.

9. Environmental Protection

9.1 The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

10. Emergency Management and Fire Protection

10.1 The licensee shall implement and maintain an emergency preparedness program.

10.2 The licensee shall implement and maintain a fire protection program for the Nuclear Power Plant.

11. Waste Management

11.1 The licensee shall implement and maintain a waste management program.

11.2 The licensee shall implement and maintain a decommissioning strategy.

12. Security

12.1 The licensee shall implement and maintain a security program.

13. Safeguards and Non-Proliferation

13.1 The licensee shall implement and maintain a safeguards program.

14. Packaging and Transport

14.1 The licensee shall implement and maintain a packaging and transport program.

15. Solid Radioactive Waste Management Facility (SRWMF)

- 15.1 The licensee shall implement and maintain a waste management program for the Solid Radioactive Waste Management Facility (SRWMF).
- 15.2 The licensee shall obtain written approval of the Commission, or consent of a person authorized by the Commission prior to the start of operations at the Phase II Extension of the SRWMF.
- 15.3 The licensee shall implement and maintain a fire protection program for the SRWMF.
- 15.4 The licensee shall submit quarterly reports to the Commission on the activities at the SRWMF.
- 16. Nuclear Facility-Specific**
- 16.1 The licensee shall implement and maintain a program for nuclear substances and prescribed equipment.

SIGNED at OTTAWA _____

Rumina Velshi
President
CANADIAN NUCLEAR SAFETY COMMISSION

PROPOSED LICENCE CONDITIONS HANDBOOK



e-Doc 6517180 (Word)

e-Doc 6706443 (PDF)

DRAFT LICENCE CONDITIONS HANDBOOK

LCH-PR-22.00/2042-R001

POINT LEPREAU NUCLEAR GENERATING STATION NUCLEAR POWER REACTOR OPERATING LICENCE

LICENCE # PROL 22.00/2042



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Licence Conditions Handbook

Effective: July 1, 2022

LCH-PR-22.00/2042 -R000

Point Lepreau Nuclear Generating Station

Nuclear Power Reactor Operating Licence

PROL 22.00/2042

SIGNED at OTTAWA the XX day of XXX XXX

Alexandre Viktorov, Director General

Directorate of Power Reactor Regulation

CANADIAN NUCLEAR SAFETY COMMISSION

Revision History:

Effective Date	Revision #	LCH e-Doc #	Description of the Changes	DCR List e-Doc #
December 23, 2021 Draft	Draft-R000	Word e-Doc 6517180	DRAFT Document prepared for Point Lepreau NGS Renewal Day 1 Commission Hearing	N/A

DRAFT

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INTRODUCTION

The general purpose of the Licence Conditions Handbook (LCH) is to identify and clarify the relevant parts of the licensing basis for each licence condition (LC) (see CNSC *REGDOC-3.5.3 Regulatory Fundamentals* for the description of licensing basis). This will help ensure the licensee conducts the activities described in the licence in accordance with the licensing basis for the facility. The LCH should be read in conjunction with the regulatory requirements, the nuclear Power Reactor Operating Licence (PROL) and licence application and supporting documents.

The LCH is organized in accordance with the Canadian Nuclear Safety Commission's (CNSC) Safety and Control Area (SCAs) Framework ([CNSC public website](#)). The SCA Framework includes fourteen SCA areas, their definitions and specific areas. The licensee may request a copy of this document at any time.

The licensing basis described in this LCH applies to the facility known as the Point Lepreau Nuclear Generating Station or PLNGS, which includes the Solid Radioactive Waste Management Facility (SRWMF). The licensing basis is a key input to establish compliance verification activities for the Point Lepreau NGS in accordance with the CNSC Power Reactor Regulatory Program Compliance Verification Strategy, e-Doc 5115523.

The LCH typically has three parts under each LC: the Preamble, Compliance Verification Criteria (CVC) and Guidance. The Preamble explains, as needed, the regulatory context, background, and/or history related to the LC. CVC are criteria used by CNSC staff to verify and oversee compliance with the LC. Guidance is non-mandatory information, including direction, on how to comply with the LC.

Throughout the PROL and LCH, the statement "consent of a person authorized by the Commission" reflects the fact that the Commission may delegate certain authority (hence "consent") to CNSC staff. Unless otherwise indicated in the CVC of specific LCs in this LCH, the delegation of authority by the Commission to act as a "person authorized by the Commission" is only applied to the incumbents of the following positions (Record of Decision for licence renewal issued XXXXX, e-Doc XXXXX):

- Director, Gentilly-2/Point Lepreau Regulatory Program Division
- Director General, Directorate of Power Reactor Regulation
- Executive Vice President and Chief Regulatory Operations Officer, Regulatory Operations Branch

Most CNSC documents referenced in the LCH are available through the CNSC public website. Documents listed on the CNSC website may contain prescribed information as defined by the General Nuclear Safety and Control Regulations. Information in these documents will be made available only to stakeholders with appropriate security clearance.

Current versions of the licensee documents listed in the LCH identified as written notification (WN) are tracked in the document "New Brunswick Power Nuclear – Point Lepreau NGS PROL 17.00/2022 Written Notification Documents in LCH – Licensing Period July 1 2022 – June 30 2042" (e-Doc 5233710), which is controlled by the Gentilly-2/Point Lepreau Regulatory Program Division (GPLRPD) and is available to the licensee upon request. **The licensee documents referenced in the LCH are not publicly available; they contain proprietary or prescribed information as defined by the *General Nuclear Safety and Control Regulations*.**

This LCH includes appendices A to F which contain acronyms, a glossary of terms and lists of LCH-related documents. More information on the LCH is available in the CNSC document titled *How to Write a Licence Conditions Handbook (LCH)* (e-Doc 4967591).

DRAFT

GENERAL

G. GENERAL

G.1 Licensing Basis for the Licensed Activities

Licence Condition G.1:

The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:

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

unless otherwise approved in writing by the Canadian Nuclear Safety Commission (CNSC, hereinafter “the Commission”).

Preamble:

Licensing Basis

The licensing basis is discussed in CNSC document REGDOC-3.5.3, *Regulatory Fundamentals (2018)*.

Licensed Activities

Paragraph 24 (1) of the *Nuclear Safety and Control Act (NSCA)* states “The Commission may establish classes of licences authorizing the licensee to carry on any activity described in any of paragraphs 26 (a) to (f) that is specified in the licence for the period that is specified in the licence.”

Paragraph 26 (a) of the NSCA states “Subject to the regulations, no person shall, except in accordance with a licence,

- (a) possess, transfer, import, export, use or abandon a nuclear substance, prescribed equipment or prescribed information;
- (b) mine, produce, refine, convert, enrich, process, reprocess, package, transport, manage, store or dispose of a nuclear substance;
- (c) produce or service prescribed equipment;
- (d) operate a dosimetry service for the purposes of this Act;
- (e) prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility; or
- (f) construct, operate, decommission or abandon a nuclear-powered vehicle or bring a nuclear-powered vehicle into Canada.”

Compliance Verification Criteria:

Part (i) of the licensing basis includes but, is not limited to, the following:

- *Nuclear Safety and Control Act;*
- *Canadian Environmental Assessment Act;*
- *Canadian Environment Protection Act;*
- *Nuclear Liability and Compensation Act;*
- *Transportation of Dangerous Goods Act;*
- *Radiation Emitting Devices Act;*
- *Nuclear Fuel Waste Act;*
- *Access to Information Act;*
- *Canada/IAEA Safeguards Agreement; and*
- *National Building Code of Canada.*

The safety and control measures mentioned in section G.1 of the licensing basis include important aspects of analysis, design, operation, etc. They may be found in high-level, programmatic licensee documents but might also be found in lower-level, supporting licensee documentation. They also include safety and control measures in licensing basis publications (e.g., CNSC regulatory documents or CSA standards) that are cited in the licence, the application, or in the licensee's supporting documentation. CNSC regulatory documents are abbreviated as REGDOC(s) and CSA standards are abbreviated as CSA followed by the applicable document number and title.

Licensing basis publications are listed in tables in this LCH under the most relevant LC. All "shall" or normative statements in licensing basis publications are considered compliance verification criteria (CVC) unless stated otherwise. If any "should" or informative statements in licensing basis publications are also considered CVC, this is explained under the most relevant LC.

The licensee documents and licensing basis publications may cite other documents that also contain safety and control measures (i.e., there may be safety and control measures in "nested" references in the application). There is no predetermined limit to the degree of nesting at which relevant safety and control measures may be found.

Not all details in referenced documents are necessarily considered to be safety and control measures, for example;

- Details that are not directly relevant to safety and control measures for facilities or activities authorized by the licence are excluded from the licensing basis.
- Details that are relevant to a different safety and control area (i.e., not the one associated with the main document), are only part of the licensing basis to the extent they are consistent with the main requirements for both safety and control areas.

In the event of any perceived or real inconsistency or conflict, between two elements of the licensing basis, the licensee shall consult CNSC staff to determine the path for resolving the issue.

In case of a conflict between CSA standards, CNSC staff will consult with the CSA before reaching a conclusion on the resolution.

This LC is not intended to unduly inhibit the ongoing management and operation of the facility or the licensee’s ability to adapt to changing circumstances and continuously improve, in accordance with its management system. Where the licensing basis refers to specific configurations, methods, solutions, designs, etc., the licensee may propose alternate approaches as long as they remain, overall, in accordance with the licensing basis and have a neutral or positive impact on health, safety, the environment, security, and safeguards. However, the licensee shall assess changes to confirm that operations remain in accordance with the licensing basis.

Changes to certain licensee documents require written notification to the CNSC, even if they are in accordance with the licensing basis. Further information on this topic is provided under LC G.2.

For an unapproved operation that is not in accordance with the licensing basis, the licensee shall take action as soon as practicable to return to a state consistent with the licensing basis, taking into account the risk significance of the situation.

In the event that the Commission grants approval to operate in a manner that is not in accordance with the existing licensing basis, this would effectively revise the licensing basis for the facility. The appropriate changes would be reflected in the CVC of the relevant LC.

Licensing Basis Documents		
Document #	Document Title	Version
LPA-00583-2022	Point Lepreau NGS - Application by New Brunswick Power Corporation for the Renewal of PROL 17.01/2022, e-Doc 6597443.	Rev. 0
N/A	CNSC Regulatory Documents and Canadian Standards Association Standards included in the Point Lepreau Nuclear Generating Station Licensing Basis, e-Doc 6672006 and Table 13 of Section 16.7 of e-Doc 6597443.	N/A
N/A	Point Lepreau NGS – CNSC Staff Technical Sufficiency Review of the Application to Renew the Power Reactor Operating Licence (PROL), e-Doc 6617668.	N/A
N/A	CNSC Regulatory Documents and Canadian Standards Association Standards – Implementation Plan Submission Dates for Recommendation and Guidance Section in the Point Lepreau Nuclear Generating Station Licensing Basis, e-Doc 6672006 and Table 13 of Section 16.7 of e-Doc 6597443.	N/A
Schedule A Amended	CNSC Financial Security and Access Agreement, e-Doc 4312511 and Point Lepreau Power Reactor Operating Licence, PROL 17.01/2022, Licence Condition G.5 – Decommissioning Financial Guarantee, e-Doc 6351954.	N/A

Guidance:

When the licensee becomes aware that a proposed change or activity might not be in accordance with the licensing basis, it should first seek direction from CNSC staff regarding the potential acceptability of this change or activity. The licensee should take into account that certain types of proposed changes might require significant lead times before CNSC staff can make recommendations and/or the Commission can properly consider them. Examples of these types of changes are discussed under various licence

conditions in this LCH. Guidance for notifications to the CNSC related to licensee changes is discussed under LC G.2.

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G.2 Notification of Changes

Licence Condition G.2:

The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.

Preamble:

CNSC staff track, in e-Doc 5233710, the list of licensee documents that require notification of the change (with the exception of security-related documents).

Compliance Verification Criteria:

Written Notification (WN) is defined as a written letter or electronic communication from a person authorized to act on behalf of the licensee to a CNSC delegated authority.

The licensee shall notify the CNSC of changes to identified licensee documents. The LCH identifies them under the most relevant LC. However, the licensee documents identified in the LCH only represent the minimum subset of documents that require notification of change. For any change that is not captured as a change to a document listed in the LCH, the licensee shall provide WN to the CNSC of the change in licensing basis documents if the change may negatively impact designs, operating conditions, policies, programs, methods, or other elements that are integral to the licensing basis. For example, if a licensee document identified in the CVC refers to another document, including a third-party document, without citing the revision number of that document, if that document changes and the licensee uses the revised version, the licensee shall determine if it is necessary to notify the CNSC of the change.

The documents needed to support the licence application may include documents produced by third parties (e.g., reports prepared by third party contractors). Changes to these documents require written notification to the CNSC only if the new version continues to form part of the licensing basis. That is, if the licensee implements a new version of a document prepared by a third party, it shall inform the CNSC of the change(s), per LC G.2. On the other hand, if a third party has updated a certain document, but the licensee has not adopted the new version as part of its safety and control measures, the licensee is not required to inform the CNSC that the third party has changed the document.

Licensee documents tabulated in the CVC of the LCH are subdivided into two groups having different requirements for notification of change - ones that require prior written notification of changes and those that require written notification at the time of implementation. For the former type, the licensee shall submit the document to the CNSC prior to implementing the change. Typically, the requirement is to submit the proposed changes 30 days prior to planned implementation; however, the licensee shall allow sufficient time for the CNSC staff to review the change proportionate to its complexity and the importance of the change. If a change modified a document that requires formal CNSC staff acceptance, additional time should be allowed. For the latter type, the licensee need only submit the document at the time of implementing the change.

WN shall include a summary description of the change, the rationale for the change, expected duration (if not a permanent change), and an explanation of how the licensee has concluded that the change remains

in accordance with the licensing basis (e.g., an evaluation of the impact on health, safety, security, the environment and Canada's international obligation). A copy of the revised WN document shall accompany the notification.

Changes that are not clearly in the safe direction require further assessment of impact to determine if Commission approval is required in accordance with LC G.1.

The licensee shall notify the CNSC in writing when it plans to implement a new licensing basis publication, including the date by which implementation of the publication will be completed. The notice shall indicate the corresponding changes to licensee documents listed in the CVC of the LCH.

The licensee's main processes that describe changes to operations or procedures are PRR-00660-OP-1 *Control and Monitor Station Equipment* and PRR-00660-SU-9 *Provide Documents and Records*. Both these processes are written notification documents listed under the management system in LCH Section 1.1.

Guidance:

A list of criteria that could help determine if a change would be in accordance with the licensing basis is provided in Appendix A of CNSC internal document "*Overview of assessing licensee changes to documents or operations*", e-Doc 4055483. Such criteria would also be used if the change requires CNSC staff acceptance, due to other requirement in the licensing basis.

For proposed changes that would not be in accordance with the licensing basis, the Guidance for LCH Section G.1 applies.

G.3 Land Use and Occupation

Licence Condition G.3:

The licensee shall control the use and occupation of any land within the exclusion zone.

Preamble:

The exclusion zone is an area, immediately surrounding a nuclear facility where no permanent habitation is allowed. The siting guide used at the time of design of all Canadian NPPs stipulated an exclusion zone that extended at least 914 metres (3000 feet) from the exterior of any reactor building [Reference: D.G. Hurst and F.C. Boyd, "Reactor Licensing and Safety Requirements, AECB-1059", Paper 72-CNA-102, presented at the 12th Annual Conference of the Canadian Nuclear Association, Ottawa, Canada, 11-14 June 1972, e-Doc 3000249.

Compliance Verification Criteria:

Document #	Document Title	Prior Notification
0086-10200-3001-001-SP-E	Site Plan Drawing	No
0086-10200-3001-002-SP-E	Site Plan Drawing	No

The licensee shall ensure that the use and occupancy of land within the exclusion zone do not compromise the safety and control measures in the licensing basis. Specifically, the licensee shall consider emergency preparedness and ALARA with respect to land use within the exclusion zone. This applies to land the licensee occupies as well as to land occupied by others.

The licensee shall not permit a permanent dwelling to be built within the exclusion zone. "Permanent dwelling" refers to housing that is meant to be fixed. The licensee may erect, for a short time without prior notification, a temporary dwelling (e.g., a trailer).

The licensee shall notify the CNSC of changes to the use and occupation of any land within the exclusion zone. The notice shall be submitted prior to the change, with lead time in proportion to the expected impact of the change on the licensee's safety and control measures.

Guidance:

There is none provided.

G.4 Office for CNSC On-Site Inspectors

Licence Condition G.4:

The licensee shall provide, at the nuclear facility and at no expense to the Commission, suitable office space for employees of the Commission who customarily carry out their functions on the premises of that nuclear facility (on-site Commission staff).

Preamble:

CNSC staff requires suitable office space and equipment at the nuclear facility in order to satisfactorily carry out its regulatory activities.

Compliance Verification Criteria:

Any changes of accommodation or equipment shall be made based on discussion, and subsequent agreement, between the CNSC and the licensee.

Suitable office space is office space that is separated from the remainder of the building in which it is located by walls or other suitable structures.

Guidance:

There is none provided.

G.5 Financial Guarantees

Licence Condition G.5:

The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission.

Preamble:

The *General Nuclear Safety and Control Regulations* requires under paragraph 3(1)(l) that a licence application contain a description of any proposed financial guarantee relating to the activity to be licensed.

The licensee is responsible for all costs of implementing the proposed decommissioning plans (see LC 11.2) and providing an appropriate financial guarantee that is acceptable to the Commission.

NB Power's Point Lepreau Decommissioning Financial Guarantees are composed of the following components:

- NB Power Decommissioning Fund – segregated fund for PLNGS and Solid Radioactive Waste Management Facility (SRWMF) decommissioning.
- NB Power Used Fuel Management Fund – segregated fund for used fuel management.
- NB Power Nuclear Fuel Waste Act Trust - the trust fund for the management of used fuel established pursuant to the [Nuclear Fuel Waste Act](#).

The acceptance of the proposed financial guarantee is a subject of a separate Commission proceeding not related to the licence renewal process

Compliance Verification Criteria:

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N294	Decommissioning of facilities containing nuclear substances	2009 ^a & Update 1	Implemented
CNSC	REGDOC-3.3.1	Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities	2021	Implemented

^aCSA standard N294, *Decommissioning of facilities containing nuclear substances* was published in 2019. NB Power to implement the requirements in 2025 Preliminary Decommissioning Plan. CNSC staff will verify compliance through its oversight activities.

Document #	Document Title	Prior Notification
PRR-00660-DM-1	Direct and Manage the Business	No
Schedule A	CNSC Financial Security and Access Agreement	Yes

The financial guarantee for decommissioning the nuclear facility shall be reviewed and revised by the licensee every five years or when the Commission requires or following a revision of the preliminary decommissioning plan that significantly impacts the financial guarantee (e-Doc 6351954).

The next full update to the 5 year reference plan for the financial guarantee purposed is expected in 2025.

The licensee shall submit annually to the CNSC staff a written report confirming that the financial guarantees for decommissioning costs remain valid and in effect and sufficient to meet the decommissioning needs.

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	G-206	Financial Guarantees for the Decommissioning of Licensed Activities	2000
CNSC	G-219	Decommissioning Planning for Licensed Activities	2000
CNSC	REGDOC-2.11.2	Decommissioning	2021 ^a

^aCNSC REGDOC-2.11.2, *Decommissioning* was published in 2021. NB Power to implement the requirements in 2025 Preliminary Decommissioning Plan. CNSC staff will verify compliance through its oversight activities.

G.6 Public Information and Disclosure

Licence Condition G.6:

The licensee shall implement and maintain a public information and disclosure program.

Preamble:

A public information and disclosure program (PIDP) is a regulatory requirement for licence applicants and licensees under the [Class I Nuclear Facilities Regulations](#), paragraph 3(i), which requires that a licence application contain a program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects of the licensed activity on the environment, health and safety of persons.

The primary goal of the PIDP, as it relates to the licensed activities, is to ensure that information related to the health, safety and security of persons and the environment, and other issues associated with the lifecycle of nuclear facilities are effectively communicated to the public.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure public information and disclosure as set out in the licensing basis (LCH Section G.1). The licensee's main core process that describes the PIDP is SI-01365-A75, *Providing Internal and External Communication*.

Licensing Basis Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC-3.2.1	Public Information and Disclosure	2018

Document #	Document Title	Prior Notification
SI-01365-A75	Managing First Nations, Community and Stakeholder Engagement and Interaction	No

Where the public has indicated an interest to know, the PIDP shall include a commitment to and disclosure protocol for ongoing, timely communication of information related to the licensed facility during the course of the licensing period.

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC 3.2.2	Indigenous Engagement, Version 1.1	2019

It is recommended that NB Power submit annually to CNSC staff a report summarizing the events and developments involving NB Power nuclear facilities for the purpose of promoting compliance verification.

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1 SCA – MANAGEMENT SYSTEM

1.1 Management System Requirements

Licence Condition 1.1:

The licensee shall implement and maintain a management system.

Preamble:

Safe and reliable operation requires a commitment and adherence to a set of management system principles and, consistent with those principles, the establishment and implementation of processes that achieve the expected results. CSA N286-12, *Management system requirements for nuclear facilities*, contains the requirements for a management system throughout the life cycle of a nuclear power plant and extends to all safety and control areas.

A management system brings together in a planned and integrated manner the processes necessary to satisfy requirements and to carry out the licensed activity in a safe manner. Management system requirements provide direction to management to develop and implement management practices and controls. The elements of a management system include areas such as organization structure and culture, resources, equipment, and information. The management system must satisfy the requirements set out in the regulations made pursuant to the *Nuclear Safety and Control Act*, the licence and the measures necessary to ensure that safety is paramount.

An adequately established and implemented management system provides CNSC staff confidence and evidence that the licensing basis under which the Commission made its decision and had issued a licence, remains valid.

The management system SCA includes the following specific areas (SpAs):

- Management system;
- Organization;
- Performance assessment, improvement and management review;
- Operating experience (OPEX);
- Change management;
- Safety Culture;
- Configuration management;
- Records management;
- Management of contractors; and
- Business continuity.

Compliance Verification Criteria:

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N286-12	Management system requirements for nuclear facilities	2012 (R2017)	Implemented
CNSC	REGDOC-2.1.2	Safety Culture	2018	Implemented
CNSC	REGDOC-2.1.1	Management System	2019	Implemented

Management System

The licensee shall implement and maintain programs to ensure a management system as set out in the licensing basis (LCH Section G.1).

The licensee’s nuclear facility operations and performance are governed by NMM-00660 “Nuclear Management Manual”. The Nuclear Management Manual is made up of a number of support processes that are applicable throughout the LCH.

The management system SpA includes the following review topics and requirements from CSA N286-12:

- Management system – Defined and implemented (Clauses 4.1, 4.1.1);
- Management system – Based on a set of principles (Clauses 4.1.2);
- Graded approach (Clause 4.1.3); and
- Management system – Work management (Clause 4.8).

The management system documentation shall contain sufficient detail to demonstrate that the described processes stated directly or by reference provide the needed direction to comply with the conditions stated in the Power Reactor Operating Licence (PROL) or licence and the criteria herein.

Organization

The licensee’s core process that describes the organization are included in the following core processes, which are written notification documents listed in the documents table below:

- NMM-00660, Nuclear Management Manual
- PRR-00660-DM-4, Assess and Improve Performance,
- PRR-00660-DM-5, Manage Processes, and
- PRR-00660-OP-1, Control and Monitor Station Equipment.

The organization SpA includes the following review topics and requirements from CSA N286-12: Organizational structure (Clause 4.4 (a)):

- Authorities, accountabilities and responsibilities (Clause 4.4 (b));
- Internal and external interfaces (Clause 4.4 (c)); with
- Decisions (Clause 4.4 (d)).

- Organizational staffing levels (Clause 4.5.1)
- Self-assessment (Clauses 4.11 and 4.11.1);
- Independent assessment (Clauses 4.11, 4.11.2 (a) and (b)); and
- Continual improvement (Clauses 4.13).

Operating Experience (OPEX)

The operating experience (OPEX) SpA includes the following review topics and requirements from CSA N286-12:

- Problem identification and resolution (Clauses 4.9, 4.9 (a) to (d));
- Actions employed to control and resolve problems (Clause 4.9);
- Experience is identified and collected (Clause 4.12 (a));
- Experience is reviewed for relevance and significance (Clause 4.12 (b));
- Actions to prevent recurrence (Clause 4.12 (c));
- Initiate improvements (Clause 4.12 (d)); and
- Experience is made available (Clause 4.12).

Change Management

The change management SpA includes the following review topics and requirements from CSA N286-12:

- Change (Clauses 4.10 and 4.10 (a) – (g));
- Completion Assurance (Clause 7.11.1); and
- Turnover (Clause 7.11.2 (a) – (e)).

Safety Culture

Licenseses shall ensure that the management of the organization supports the safe conduct of nuclear activities. The licensee shall ensure that sound nuclear safety is the overriding priority in all activities performed in support of the nuclear facilities and has clear priority over schedule, cost and production.

Clause 4.2 of CSA N286-12 contains requirements related to the oversight, understanding and promotion of safety culture.

A safety culture self-assessment methodology is developed following a continuous improvement process, which is governed by SI-01365-A62, *Self Assessments and Benchmarking* and SDP-01368-A44, *Conducting Nuclear Safety Culture Assessment and Nuclear Safety Culture Monitoring Panel*. Changes will be managed in accordance with SI-01365-A076, *Managing Change*.

Configuration Management

Configuration management shall be incorporated into all aspects of purchasing, construction, commissioning, operating, and maintenance documentation so that the as-built configuration of the facility is aligned with the design and safety analysis in accordance with CSA N286-12 Clause 7.5. This includes the establishment of processes for making the identification and labelling of structures, systems and components and identification and marking of items to control their use and establish traceability where required.

With regard to modifications, the design basis for the plant should be documented and maintained to reflect design changes to ensure adequate configuration management. See LC 5.1, 5.2 and 5.3 for more information regarding the plant design. The design basis should be maintained to reflect new information, operating experience, safety analyses, and resolution of safety issues or correction of deficiencies. The impacts of the design changes should be fully assessed, addressed and accurately reflected in the safety analyses prior to implementation.

Records Management

The records management SpA includes the following review topics and requirements from CSA N286-12:

- Documentation of the management system (Clause 4.7.1);
- Information (Clause 4.7.2 (a - d));
- Documents (Clause 4.7.3 (a-f)); and
- Records (Clause 4.7.4 (a-g)).

Management of Contractors

The management of contractors SpA includes the following review topics and requirements from CSA N286-12:

- The Supply Chain Process (Clause 7.6 and 7.6.1);
- Purchasing Requirements (Clause 7.6.2 (a - l));
- Supplier Acceptability (Clauses 7.6.3.1 to 7.6.3.5);
- Provision of the purchasing requirements to suppliers (Clause 7.6.4);
- Supplier selection and award (Clause 7.6.5);
- Supplier-customer relationship (Clause 7.6.6 (a-e));
- Verification Services (Clause 7.6.7);
- Receipt and Inspection of Items (Clauses 7.6.8 and 7.6.8.1 to 7.6.8.2);
- Segregation and disposition of problem items (Clause 7.6.9);
- Storage and Handling (Clause 7.6.10 (a-e); and
- Planning for replacement parts (Clause 7.6.11 (a-g)).

Business Continuity

The business continuity SpA includes the following review topics and requirements from CSA N286-12:

- Business Planning (Clause 4.3 and 4.3 (a) to (f));
- Resources (Clauses 4.5 and 4.5.1); and
- Financial Resources (Clause 4.5.3).

Business Continuity is addressed in SI-01365-EP02, *Emergency Response Plan*, which addresses various events including security type events, which would include labour disruptions (see LCH Section 10.1) and SDP-78660-0001, *Pandemic Response Plan*. Minimum Shift Complement (MSC) as defined in SDP-01368-P36, *Meeting Minimum Operational Staffing Requirements* is also a key document in support of the business continuity (see LCH Section 2.2).

Document #	Document Title	Prior Notification
NMM-00660	Nuclear Management Manual ^a	Yes
PRR-00660-DM-2	Manage External Relationships	No
PRR-00660-DM-3	Manage Independent Nuclear Oversight	No
PRR-00660-DM-4	Assess and Improve Performance	No
PRR-00660-DM-5	Manage Processes	No
PRR-00660-OP-2	Control Chemistry	No
PRR-00660-OP-4	Fuel the Reactor	No
PRR-00660-MA-2	Provide Planning and Scheduling Services	No
PRR-00660-MA-3	Perform Maintenance	No
PRR-00660-ME-1	Establish Maintenance Programs	No
PRR-00660-ME-2	Monitor and Manage System Health	No
PRR-00660-MS-1	Develop Modifications	No
PRR-00660-MS-2	Implement Modifications	No
PRR-00660-SU-1	Provide Human Resources	No
PRR-00660-SU-2	Provide Environmental Services	No
PRR-00660-SU-3	Provide Training	No
PRR-00660-SU-4	Provide Personnel Safety Services	No
PRR-00660-SU-5	Provide Emergency Preparedness Services	No
PRR-00660-SU-6	Provide Security Services	No
PRR-00660-SU-9	Provide Documents and Records	No
PRR-00660-SU-10	Provide Project Services	No
PRR-00660-SU-11	Provide Facilities	No
PRR-00660-SU-12	Provide Materials and Services	No
Other Documents		

Document #	Document Title	Prior Notification
SI-01365-A76	Managing Change	No
SI-01365-A234	Providing Nuclear Safety Oversight	No
SDP-78660-0001	Pandemic Response Plan	No
SI-01365-A62	Self Assessments and Benchmarking	No
SI-01365-A88	Performing Internal Independent Nuclear Oversight	No
SDP-01368-A44	Conducting Nuclear Safety Culture Assessment and Nuclear Safety Culture Monitoring Panel	No

*Nuclear Management Manual – Support Processes (Applicable throughout the LCH)

Guidance:

The management system should be used to promote and support a healthy safety culture. The CNSC recognizes the following characteristics that form the framework for a healthy safety culture:

- Safety is a clearly recognized value;
- Accountability for safety is clear;
- Safety is integrated into all activities;
- A safety leadership process exists, and
- Safety culture is learning-driven.

REGDOC-2.1.2 provides additional guidance for fostering a healthy safety culture and for conducting safety culture assessments.

CNSC staff encourages NB Power senior management to continue to foster a healthy safety culture to ensure that NB Power staff understands the influence that safety culture has over all organizational processes and its role in maintaining and improving safety performance.

Guidance Publications			
Source	Document #	Document Title	Version
CSA	N286.0.1	Commentary on N286-12 Management system requirements for nuclear facilities	2021
CSA	N286.10	Configuration management for high energy reactor facilities	2016

2 SCA – HUMAN PERFORMANCE MANAGEMENT

The human performance management SCA includes the following SpAs:

- Human performance program (LC 2.1);
- Personnel training (LC 2.3);
- Personnel certification (LC 2.4);
- Initial certification and requalification tests (LC 2.4);
- Work organization and job design (LC 2.2); and
- Fitness for Duty (LC 2.1).

2.1 Human Performance Program

Licence Condition 2.1:

The licensee shall implement and maintain a human performance program.

Preamble:

Paragraph 3(d.1) of the *Class I Nuclear Facilities Regulations* requires that a licence application contain the proposed human performance program for the activity to be licensed, including measures to ensure workers' fitness for duty.

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; through error prevention tools and managed defences;
- Organizational support for safe work activities;
- The continuous improvement of human performance; and
- Monitoring the fitness for duty of workers including their hours of work.

It is important that the licensee continuously monitors human performance, takes steps to identify human performance weaknesses, improve human performance and reduce the likelihood of nuclear safety events that are attributable to human performance.

Human Factors are factors that influence human performance as it relates to the safety of a nuclear facility or activity over all design and operations phases. These factors may include the characteristics of the person, task, equipment, organization, environment, and training. The consideration of human factors in issues such as interface design, training, procedures, fitness for duty, and organization and job design may affect the reliability of humans performing tasks under various conditions.

CNSC regulatory document REGDOC-2.2.1, *Human Factors*, describes how the CNSC will take human factors into account during its licensing, compliance and standards-development activities.

For clarification, CNSC regulatory oversight related to hours of work is for the purpose of “nuclear safety” not for the purpose of “worker protection”. Worker protection is covered under the SCA “Conventional Health and Safety” (See LCH Section 8).

Compliance Verification Criteria:

Human Performance Programs

Human performance program is an integrated approach of strategies, policies, processes and practices that considers a broad range of human and organizational factors. The human performance program interfaces with other programs with regard to human factors aspects.

The licensee’s main core process that describes the human performance programs is SI-01365-A131, *Human Performance Process*.

Clause 4.2 of CSA N286-12 identifies requirements needed to address human performance programs. See LCH Section 1.1 for version control of CSA N286-12.

Fitness for Duty

The licensee shall also monitor and control the fitness for duty of its workers at all times by implementing and maintaining IR-00583-01, *Fitness for Duty Program* and SDP-03168-A031, *Implementing the Fitness for Duty Program*. Specific fitness for duty requirements for certified personnel can be found in Section 11 of REGDOC-2.2.3, Volume III (see LCH Section 2.4) and those for nuclear security officers can be found in CNSC regulatory document REGDOC-2.2.4 *Fitness for Duty, Volume III: Nuclear Security Officer Medical Physical and Psychological Fitness* (see LCH Section 12.1).

Alcohol and Drug Use

REGDOC-2.2.4 *Fitness for Duty, Volume II: Managing Alcohol and Drug Use*, sets out requirements and guidance for managing fitness for duty of workers in relation to alcohol and drug use and abuse. Version 3 was published 22 January 2021. As detailed in CNSC’s letter e-doc 5865510 CNSC staff accepted the revised implementation timeline described in NB Power correspondence e-doc 5865505. As detailed in the revised implementation timeline, NB Power will implement version 3 by 22 July 2021 with the exception of random testing which will be implemented by 22 January 2022.

Nuclear Security Officer Medical, Physical and Psychological Fitness

REGDOC-2.2.4 *Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical and Psychological Fitness*, was published in September 2018. As described in NB Power letter e-doc 6051687, NB Power implemented REGDOC-2.2.4 Volume III on 14 November 2019.

Fatigue Management and Hours of Work

REGDOC-2.2.4 *Fitness for Duty: Managing Worker Fatigue* was published in 2017. As described in NB Power letter e-doc 6310599, NB Power revised its implementation plan and committed to implement REGDOC-2.2.4 by March 1, 2021 except for outages, with implementation for outages by June 30, 2022. SI-01365-A106, *Controlling Hours of Work for Shift Workers*, and SI-01365-A45, *Controlling Hours of Work for Regular Day Workers* are the main documents that describe how NB Power addresses the requirements of REGDOC-2.2.4 *Fitness for duty: Managing Worker Fatigue*.

Document #	Document Title	Prior Notification
SI-01365-A131	Human Performance Process	No
SI-01365-A106	Controlling Hours of Work for Shift Workers	Yes
SI-01365-A45	Controlling Hours of Work for Regular Day Workers	Yes
SDP-01368-CA09	Conducting Human Performance Event Evaluations and Lessons Learned	No
IR-00583-01	Fitness for Duty Program	No
SI-01365-A133	Implementing the Fitness for Duty Program	No
SI-01365-A071	Controlling Documents	No
SDP-01368-A037	Continuous Behaviour Observation Program	No

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 2.2.4	Fitness for Duty: Managing Worker Fatigue	2017	see note ^a
CNSC	REGDOC 2.2.4	Fitness for Duty, Volume II: Managing Alcohol and Drug Use	2021	see note ^b
CNSC	REGDOC 2.2.4	Fitness for Duty, Volume III Nuclear Security Officer Medical, Physical, Psychological Fitness	2018	Implemented

^a 2021-03-01 (all except outages) and 2022-06-30 (outages)

^b 2021-07-22 (all except random testing) 2022-01-22 (random testing)

Guidance:

The Human Performance Program should address and integrate the range of human factors that influence human performance, which include, but may not be limited to the following:

- The provision of qualified staff
 - Certification and Training
 - Staffing
 - Minimum Shift Complement
- The reduction of human error
 - Human Factors in Design

- Procedures Development
- Procedural Compliance
- Work protection and Work Permit Systems
- Shift Turnover
- Pre and Post Job Briefings
- Human Actions in Safety Analysis
- Safe work strategies/practices
- Organizational factors that influence safety performance through the support of safe work activities
 - Organization and Management Processes and Safety culture
- The continuous improvement of human performance
- Fitness for duty
 - Hours of work and fatigue management
 - Alcohol and drug use management
 - Medical, physical and psychological fitness

In addition to certified personnel, the licensee shall implement and maintain fitness for duty requirements for all workers. Oversight requirements shall also be identified for supervisors of certified and security personnel. Licensees shall have in place a documented fitness-for-duty sub-program which confirms that any person filling a minimum shift complement (812810) position does not have a physical or mental limitation that would make the person incapable of performing the duties of the applicable position, as stated in REGDOC 2.2.5 *Minimum Staff Complement*.

Guidance Documents

Guidance for considering human factors in design programs is provided in REGDOC 2.5.1, *General Design Considerations: Human Factors*.

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC 2.2.1	Human Factors	2019
CNSC	REGDOC 2.2.5	Minimum Staff Complement	2019

2.2 Minimum Shift Complement and Control Room Staffing

Licence Condition 2.2:

The licensee shall implement and maintain the minimum shift complement and control room staffing for the Point Lepreau NGS.

Preamble:

The minimum shift complement specifies the numbers of qualified staff that are required to operate and maintain unit(s) safely under all operating states including normal operations, anticipated operational occurrences, design basis accidents and emergencies.

This licence condition requires the presence of a sufficient number of qualified workers at all times to ensure the safe operation of the nuclear facility and adequate emergency response capability.

A pandemic response plan, which is necessary to meet minimum shift complement requirements at all times, is covered under LCH Section 1.1.

Compliance Verification Criteria:

Document #	Title	Prior Notification
SDP-01368-P36	Meeting Minimum Operational Staffing Requirements	Yes

Work organization and Job Design

Minimum Shift Complement (MSC)

The licensee’s main core process that describes minimum shift complement (MSC) is SDP-01368-P36, *Meeting Minimum Operational Staffing Requirements*. It describes the minimum number of workers with specific qualifications required for the safe operation of the nuclear facilities-under all operating states and the measures in place to mitigate the impact of any MSC non-compliances until minimum complement requirements are restored. The table below provides the MSC as defined in SDP-01368-P36 *Meeting Minimum Operational Staffing Requirements*.

The licensee’s MSC describes the minimum number of workers with specific qualifications required for normal operations and unplanned outages and complex reactivity evolutions and the measures in place to mitigate the impact of any minimum shift complement non-compliances until minimum complement is restored. The licensee shall operate the staffing and organization of the nuclear facility as described in the document, PRR-00660-SU-1, *Provide Human Resources* and section 0.05 of the document, RD-01364-L3, *Operating Policies and Principles (OP&P)* as it relates to minimum shift complement. See LCH Section 1.1 and 3.1 for more information on these documents.

The licensee shall operate the nuclear facility in accordance with these documents and shall monitor and keep records of each shift’s complement.

The MSC is considered as part of the licensing basis. Changes to the MSC are subject to LC G.1 as discussed in LCH Section G.1. The following table summarize the facility’s MSC.

Minimum Shift Complement

Work Group/Position	Number Required
Shift Supervisor	1
Control Room Operator	1
Field Operations Supervisor	1
Senior Power Plant Operators	3
Power Plant Operators	5
Chemical Maintainer	1
An ^a (Contingency Desk Operator)	1
Electrical Instrumentation & Control Maintainer	2
ERT Leader Emergency Response	1
ERT Maintainer	8
Total	24

^aShift Technician personnel qualified to staff the Contingency Desk are preferred. The Contingency Desk may be staffed by qualified Operations personnel provided they have not been credited as part of the minimum Duty Shift complement.

Control Room Staffing

The licensee’s main core process which describes control room staffing is PRR-0660-OP-1, *Control and Monitor Station Equipment*, a written notification document listed under the management system in LCH Section 1.1.

The licensee shall comply with the minimum certified personnel requirements for the nuclear facility and for the main control room. The certified positions are listed in LC 2.4 and LCH Section 2.4.

In conjunction with the MSC for the facility, the licensee shall maintain adequate control room staffing. For the following certified positions, the licensee shall have the corresponding certified personnel at all times:

- in the nuclear facility, at least one control room operator and one shift supervisor; and
- in the main control room one control room operator or one shift supervisor in direct attendance at the control panels of the reactor unit.

The minimum personnel requirements for the main control room that this condition imposes do not apply where this minimum cannot be met due to emergency conditions that could cause an unwarranted hazard to personnel in the main control room, in which case the licensee shall place the reactor in a safe shutdown state and the nuclear facility in a safe condition.

“In direct attendance” means the certified person must physically be in the direct line of sight and in close proximity to the control room panels to continuously monitor, recognize and differentiate panel displays, alarms and indications.

A certified person shall be in a position to rapidly respond, in accordance with his/her role, to changing unit conditions, at all times. NB Power shall provide a rolling 5-year staffing profile of certified operators on an annual basis.

Guidance:

REGDOC-2.5.1 *General Design Considerations: Human Factors*, describes the elements of effective human factors verification and validation planning, including a suggested format for documenting these elements.

A verification and validation plan documents the set of activities within a specific project that will be carried out to demonstrate that the human factors considerations of the project conform to accepted human factors principles. This will ensure that the licensee enables personnel to perform their tasks safely and to meet operational goals.

REGDOC-2.2.5 *Minimum Staff Complement*, describes the CNSC recommended approach for defining the minimum shift complement and sets out the key factors that CNSC staff will take into account when assessing whether the licensee has made, or the applicant will make, adequate provision for ensuring the presence of a sufficient number of qualified staff.

The adequacy of the minimum shift complement should be determined through a systematic analysis of the most resource-intensive conditions under all operating states, design basis accidents, and emergencies. The results of the analysis should then be validated to determine the degree to which the minimum shift complement facilitates the achievement of the overall safety goals.

Verification of the MSC may include: requiring all staff members to sign in (this also serves as notification of absences) and checking names against the list of qualified staff members of the MSC in a corporate database.

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC 2.2.5	Minimum Staff Complement	2019
CNSC	REGDOC 2.5.1	General Design Considerations: Human Factors	2019

2.3 Personnel Training

Licence Condition 2.3:

The licensee shall implement and maintain training programs for workers.

Preamble:

This LC provides the regulatory requirements for the development and implementation of training programs for workers.

It also provides the requirements regarding the program and processes necessary to support responsibilities of, qualifications and requalification training of persons at the nuclear facility.

As defined by the *General Nuclear Safety and Control Regulations*, a worker means a person who performs work that is referred to in a licence. This includes contractors and temporary employees. Training requirements apply equally to these types of workers as to the licensee's own employees.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure personnel training as set out in the licensing basis (LCH Section G.1).

Document #	Title	Prior Notification
PRR-00660-SU-3	Provide Training	No
SI-01365-TR25	Systematic Approach to Training Process	No
GU-97214-0011	Training Program Management	No
PRR-00660-OP-1	Control and Monitor Station Equipment	No
PRR-00660-OP3	Control Effluents	No
PRR-00660-SU-4	Providing Personnel Safety Services	No
PRR-00660-SU-2	Provide Environmental Services	No

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 2.2.2	Personnel Training	2016	Implemented

Personnel Training

The licensee shall implement and maintain training programs for workers in accordance with REGDOC 2.2.2 *Personnel Training*, which defines the requirements regarding the development and implementation of a training system.

REGDOC 2.2.2 also provides the requirements necessary to support initial certification training and renewal of certification training of persons for the positions listed in LC 2.4, and as required by REGDOC-2.2.3, *Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants*.

The licensee's main core processes that describe the training program is PRR-00660-SU-3, *Provide Training, SI-01365-TR25, Systematic Approach to Training Process*, GU-97214-0011 *Training Program Management* and further supporting the operations certification training is PRR-00660-OP-1, *Control and Monitor Station Equipment*, and for the senior health physicist training is PRR-00660-OP3, *Control Effluents*, PRR-00660-SU-4, *Providing Personnel Safety Services* and PRR-00660-SU-2, *Provide Environmental Services*.

The licensee shall ensure that all workers are qualified to perform the duties and tasks required of their position.

All training programs related to workers in positions where the consequence of human error poses a risk to the environment, the health and safety of persons, or to the security of the nuclear facilities and licensed activities, are evaluated against the criteria for a systematic approach to training (SAT).

Guidance:

Guidance is provided in Section 5 and Appendix A of REGDOC 2.2.2 *Personnel Training*.

2.4 Personnel Certification

Licence Condition 2.4:

The licensee shall implement and maintain certification programs in accordance with CNSC regulatory document REGDOC-2.2.3, *Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants*.

Persons appointed to the following positions require certification:

- (i) Senior Health Physicist;**
- (ii) Shift Supervisor; and**
- (iii) Control Room Operator.**

Preamble:

The licensee's documentation describes the authority and responsibilities associated with said positions.

This LC provides the regulatory requirements for the initial certification, the renewal of certification and training of personnel for the positions listed in the LC.

It also provides the requirements regarding the program and processes necessary to support the certification of personnel at the nuclear facility.

As defined by the *General Nuclear Safety and Control Regulations*, workers including contractors and temporary employees who perform work that is referred to in the licence. Training and certification requirements apply equally to these types of workers as to the licensee's own employees.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure certification and examination as set out in the licensing basis (LCH Section G.1).

Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 2.2.2	Personal Training	2016	Implemented
CNSC	REGDOC 2.2.3	Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants	2019	Implemented
CNSC	EG1	Requirements and Guidelines for Written and Oral Certification Examinations for Shift Personnel at Nuclear Power Plants	2005	Implemented
CNSC	EG2	Requirements and Guidelines for Simulator-Based Certification Examinations for Shift Personnel at Nuclear Power Plants	2004	Implemented

Source	Document #	Document Title	Version	Implementation Date
CNSC	N/A	Requirements for the Requalification Testing of Certified Shift Personnel at Nuclear Power Plants	Rev.2 2009	Implemented

Personnel Certification

Document #	Document Title	Prior Notification
IR-03541-0011	Senior Health Physicist Roles and Responsibilities at PLNGS	Yes
EXP-08700-0010	Operations Expectations and Practices	Yes
TPD-97177-01	Shift Supervisor Incremental Training Program	No
TPD-97170-01	Control Room Operator Candidate Training Program Description	No
TPD-97179-01	Certified Staff Continuing Training Program Description	No
TPD-97215-01	Senior Health Physicist Certification Training Program	No
SDP-01368-TR06	Simulator Certification Examinations	Yes
SDP-01368-TR07	Simulator Comprehensive Examinations	No
SDP-01368-TR08	Knowledge-Based Certification Examinations	Yes
SDG-97173-0004	Generals program initial certification standards for development and administration of closed reference multiple choice written examinations questions	Yes
SDP-01368-TR15	Testing Certified Shift Personnel for Requalification	No

The licensee shall implement and maintain a certification training and examination program in accordance with REGDOC 2.2.2 and REGDOC-2.2.3 Volume III, including any transitional provisions. REGDOC 2.2.2 defines the requirements regarding the development and implementation of a training system. REGDOC-2.2.3 Volume III defines the requirements regarding certification of persons working at NPP in positions that have a direct impact on nuclear safety.

Certified personnel shall carry out their authorities and responsibilities as per their respective role documents.

The licensee shall ensure that personnel are qualified, and maintain their qualifications to perform the duties and tasks required of their position.

The licensee's main core processes that describe the certification training and examination programs and the authorities and responsibilities, which are written notification documents and are listed under the CVC in section 2.3.

The licensee documents that describe the roles and responsibilities of the certified personnel are important inputs to the certification training and examination programs.

Until the revision of REGDOC-2.2.3 Volume III, the procedures specified in section 6.0 shall include the qualification requirements specifying the prerequisite knowledge and level of experience required for the certified incumbent to effectively monitor and evaluate candidate knowledge and performance in that position.

The licensee shall ensure that personnel appointed to the position of senior health physicist, shift supervisor, or control room operator hold a certification for the position to which they have been appointed, in accordance with the requirements of the [NSCA](#).

The senior health physicist at the nuclear facility shall not delegate the authority or the responsibilities of the position, except to another individual who holds a certification as senior health physicist delegate issued under the [NSCA](#).

The delegation of authority for the senior health physicist is specified in EXP-03400-0001, Radiation Protection Expectations and Directives, a prior written notification document (see LCH Section 7.1).

Certified personnel shall carry out their authorities and responsibilities as per their respective role documents listed as written notification documents.

When applying for initial certification or renewal of certification of a worker for a position listed, the licensee shall submit the information required pursuant to section 9 of [Class I Nuclear Facilities Regulations](#) and shall confirm that the person meets the relevant certification requirements applicable to that position, specified in REGDOC-2.2.3 Volume III.

The authorities and responsibilities of the certified positions listed above are considered safety and control measures. Any changes to them will be reviewed by CNSC staff to confirm they remain within the licensing basis in accordance with LCs G.1 and G.2, in consultation with the designated officer to certify and decertify persons referred to in section 9 and 12 of the *Class I Nuclear Facilities Regulations* and the Director of the Personnel Certification Division. Changes outside the licensing basis will require prior written approval of the Commission, per LC G.1.

Conduct of Examinations and Tests for Certified Personnel

Currently, the following three CNSC internal documents contain the requirements for administering the certification examinations and requalification tests required by REGDOC-2.2.3 Volume III:

- **CNSC-EG1** *Requirements and Guidelines for Written and Oral Certification Examinations for Shift Personnel at Nuclear Power Plants;*
- **CNSC-EG2** *Requirements and Guidelines for Simulator-based Certification Examinations for Shift Personnel at Nuclear Power Plants;* and
- **CNSC** *Requirements for the Requalification Testing of Certified Shift Personnel at Nuclear Power Plants.*

For the General Certification Examinations specified in CNSC document CNSC-EG1, the following Compliance Verification Criteria (CVC) shall be applied:

NB Power may choose to administer General Certification Examinations using a Multiple Choice Question (MCQ) format. The development, conduct and marking of MCQ General Certification Examinations shall be in accordance with the following NBP documents:

- SDP-01368-TR08, Development and Administration of Knowledge-Based Written and Oral Examinations for Initial Certification Training Programs,
- SDG-97173-0004, Generals program initial certification standards for development and administration of closed reference multiple choice written examinations questions

Note: Paragraph 13.1.6 of REGDOC-2.2.3 Volume III will be amended during the next regulatory document revision to align with the written requalification test requirements in CNSC document, Requirements for the Requalification Testing of Certified Shift Personnel at Nuclear Power Plants, Revision 2. In the interim, for REGDOC-2.2.3 Volume III paragraph 13.1.6, CNSC staff will apply the following compliance criteria: “The person must have successfully completed written requalification tests equivalent in number to those referred to in the NPP licence that the person would have had to take during the period of absence, if the person had continued to work in the position.”

Guidance:

There is none provided.

3 SCA – OPERATING PERFORMANCE

The operating performance SCA includes the following SpAs:

- Conduct of licensed activity (LC 3.1);
- Procedures (LC 3.1);
- Reporting and trending (LC 3.3);
- Outage management performance (LC 3.1);
- Safe operating envelope (LC 3.1); and
- Severe accident management and recovery (LC 3.1, LC 3.2); and
- Integrated accident management and recovery (LC 3.1, LC 3.2).

3.1 Operations Program

Licence Condition 3.1:

The licensee shall implement and maintain an operations program, which includes a set of operating limits.

Preamble:

The operations program establishes safe, uniform and efficient operating practices within the nuclear facility, under all operating conditions (routine and non-routine), and provides the ability to ensure the facility is operated in such a manner that:

- applicable regulations, licence conditions, and standards are followed;
- the requirements of the operating policies and principles (OP&Ps) are implemented;
- limits established in accordance with a safe operating envelope (SOE) are not exceeded; and
- safety enhancements for continued safe operations are implemented in accordance with the integrated implementation plan (IIP).

Compliance Verification Criteria:

Document #	Document Title	Prior Notification
EXP-08700-0010	Operations Expectations and Practices	Yes
SI-01365-P103	Managing Significant Issues	No
SI-01365-P99	Monitoring and Operating Station Equipment	No
SI-01365-P01	Work Protection	No
SI-01365-T32	Using Operating Experience	No
SDP-01368-P30	Maintaining Plant Status Change Control	No
SDP-01368-P22	Controlling the Guaranteed Shutdown State	Yes
SDP-01368-P27	Performing Technical Operability Evaluations	No

Document #	Document Title	Prior Notification
SI-01365-A63	Implementing the Corrective Action Process	No
RD-01364-L3	Operating Policies and Principles	Yes
RD-01364-L23	Solid Radioactive Waste Management Facility Operating Policies and Principles	Yes
SOE-68200-01	Safe operating envelope for the PLGS shutdown system number one (SDS1) SOE overview	No
SOE-68300-01	Safe operating envelope for the PLGS shutdown system number two SDS2	No
SOE-68400-01	Safe operating envelope for the PLGS containment system	No
SOE-34320-01	Safe operating envelope for the PLGS Emergency Core Cooling (ECC) system	No
SOE-03100-01	Safe operating envelope for PLGS reactor physics parameters	No
SOE-32110-01	Safe operating envelope for the PLGS moderator and cover gas systems	No
SOE-33300-01	Safe operating envelope for the PLGS pressure and inventory control system	No
SOE-33410-01	Safe operating envelope for the PLGS shutdown cooling system	No
SOE-34110-01	Safe operating envelope for the PLGS shield cooling system	No
SOE-34610-01	Safe operating envelope for the PLGS emergency water supply, boiler make-up water and emergency power supply systems	No
SOE-35000-01	Safe operating envelope for the PLGS fuel handling systems	No
SOE-43230-01	Safe operating envelope for the PLGS auxiliary boiler feedwater system	No
SOE-50000-01	Safe operating envelope for the PLGS electrical power system	No
SOE-68000-01	Special safety system trip parameter surveillance limits for normal operation	No
SOE-71300-01	Safe operating envelope for the PLGS raw service water and recirculated cooling water systems	No
SOE-73160-01	Safe operating envelope for the PLGS emergency filtered containment venting (EFCV) system	No
SOE-75120-01	Safe operating envelope for the PLGS instrument air system	No
SOE-68200-02	SDS1 safe operating envelope implementation report	No
SOE-68300-02	SDS2 safe operating envelope implementation report	No
SOE-68400-02	Containment safe operating envelope implementation report	No

Document #	Document Title	Prior Notification
SOE-34320-02	ECC safe operating envelope implementation report	No
SOE-03100-02	Safe operating envelope for the reactor physics parameters implementation report	No
SOE-32110-02	Moderator and cover gas systems safe operating envelope implementation report	No
SOE-33300-02	HT pressure and inventory control system safe operating envelope implementation report	No
SOE-33410-02	Shutdown cooling system safe operating envelope implementation report	No
SOE-34110-02	End shield cooling system safe operating envelope implementation report	No
SOE-34610-02	Emergency water supply, boiler make-up water and emergency power supply systems safe operating envelope implementation report	No
SOE-35000-02	Fuel handling SOE implementation	No
SOE-43230-02	Auxiliary boiler feedwater system safe operating envelope implementation report	No
SOE-50000-02	Electrical power system safe operating envelope implementation report	No
SOE-68000-02	Special safety system trip parameter surveillance limits implementation report	No
SOE-71300-02	Raw service water and recirculating cooling water system safe operating envelope implementation report	No
SOE-73160-02	Emergency filtered containment venting system safe operating envelope implementation report	No
SOE-75120-02	Instrument air system safe operating envelope implementation report	No
SI-01365-T112	Maintaining the safe operating envelope	Yes
GU-04500-SA04	Safe operating envelope methodology	No

Document #	Document Title	Prior Notification
0087-78600-SAMG-CR1-EP	Severe Accident Management Guidelines Control Room Guide #1 Shift Supervisor Initial Response	No
0087-78600-SAMG-015-IR	Basis For SAMG/SACRG1 Initial Response	No
0087-78600-SAMG-CR2-EP	Severe Accident Management Guidelines Control Room Guide #2 ICS Planning Section Functional	No
0087-78600-SAMG-016-IR	Basis For SAMG Control Room Guide #2 ICS Planning Section Functional	No
0087-78600-SAMG-DFC-EP	Diagnostic Flowchart – Severe Accident Management Guidelines	No
0087-78600-SAMG-017-IR	Diagnostic Flowchart (DFC) Basis Document	No
0087-78600-SAMG-SCT-EP	Severe Challenge Status Tree – Severe Accident Management Guidelines	No
0087-78600-SAMG-018-IR	Severe Accident Management Guidelines Severe Challenge Status Tree Basis Document	No
0087-78600-SAMG-SD1-EP	Severe Accident Management Guide For Outages (Shutdown State)	No

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N290.11	Requirements for reactor heat removal capability during outage of nuclear power plants	2013	Implemented
CSA	N290.14	Qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants	2015 ^a	Implemented
CSA	N290.15	Requirements for the safe operating envelope for nuclear power plants	2019	Implemented
CNSC	REGDOC 2.3.2	Accident management, Version 2	2015	Implemented
CNSC	REGDOC 2.3.3	Periodic Safety Reviews	2015	Implemented

^aCSA standard N290.14, *Qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants (R2020)*: NB Power plans compliance by 2022, April 30. CNSC staff will verify compliance through its oversight activities.

Conduct of Licensed Activity

The conduct of licensed activity SpA includes the following review topics and requirements from CSA N286-12:

- Operations program;

- Plant status control (Clauses 7.9.3 and 7.9.3 (a-f)); and
- Infrequently performed operations (Clauses 7.9.8 and 7.9.8 (a-e)).

Periodic Safety Review

A periodic safety review (PSR) is a comprehensive evaluation of the design, condition and operation of a nuclear power plant. It is an effective way to obtain an overall view of actual plant safety and the quality of the safety documentation, and to determine reasonable and practical enhancements to ensure continued safe operation until the next PSR or, where appropriate, until the end of commercial operation.

NB Power is required to conduct a PSR in accordance with REGDOC-2.3.3 *Periodic Safety Reviews* every 10 years during the licencing period. NB Power is required to prepare and implement an IIP in accordance with REGDOC-2.3.3. NB Power is required to submit the IIP for acceptance by CNSC staff and the Commission.

Compliance Verification Criteria:

Licensing Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 2.3.3	Periodic Safety Reviews	2015	Implemented
CNSC	RD-360	Life Extension of Nuclear Power Plants	2008	Implemented

Document #	Document Title	Prior Notification
SI-01365-A126	Conducting a Periodic Safety Review	No
IR-03612-0023	Periodic Safety Review 2 (PSR2) Integrated Implementation Plan	Yes

NB Power shall conduct PSRs during the licencing period, on 10-year intervals and in accordance with REGDOC-2.3.3 *Periodic Safety Reviews*. NB Power shall prepare and implement an IIP in accordance with REGDOC-2.3.3. NB Power shall submit the PSR and IIP for acceptance by CNSC staff.

NB Power shall update the licensing basis to include subsequent IIPs. NB Power is required to submit the IIP for Commission approval, during public proceedings.

NB Power shall seek CNSC staff concurrence before making changes to the IIP actions.

NB Power shall provide quarterly updates on the IIP actions and must request closure of an IIP action.

Guidance Publications			
Org	Document #	Title	Version
CSA	N290.18	Periodic safety review for nuclear power plants	2017
IAEA	Specific Safety Guide No. SSG-25	Periodic Safety Review for Nuclear Power Plants	2013

Guidance:

None

Operations Program

The licensee shall implement and maintain operations programs. These programs shall consist of, at a minimum, a safe operating envelope, a set of operating policies and principles, and accident management procedures and/or guides for design basis and beyond design basis accidents, including overall strategies for recovery.

The conduct of licensed activity SpA includes the following review topics and requirements from CSA N286-12:

- Operations program;
- Plant status control (Clauses 7.9.3 and 7.9.3 (a-f)); and
- Infrequently performed operations (Clauses 7.9.8 and 7.9.8 (a-e)).

The licensee’s main core processes that govern the operation of the station, which are written notification documents listed under the management system in LCH Section 1.1, are:

- PRR-00660-DM-4, *Assess and Improve Performance*, and
- PRR-00660-OP-1, *Control and Monitor Station Equipment*.

Clauses 7.9.1, 7.9.3, 7.9.4, 7.9.6 and 7.9.7 of CSA N286-12, a compliance verification criteria document listed under the management system in LCH Section 1.1, describes some requirements related to the following topics:

- General operating,
- Plant status control,
- Surveillance,
- Procedure use and adherence, and
- Emergency procedures.

Tasks shall be supported by procedures that are fit for purpose and are used appropriately to minimize the potential for human error.

The licensee is to periodically review its corrective action program to identify trends.

Operation in states not considered in, or not bounded by, the safety analyses is not permitted.

Aspects of operations or procedures that impact the limits documented in the operating policies and principles or safe operating envelope are considered safety and control measures and therefore subject to LCH Section G.1.

Operating Policies and Principles

The operating policies and principles (OPPs), RD-01364-L3, *Operating Policies and Principles* shall provide framework for the safe operation and as a minimum, reflect the safety analyses that have been previously submitted to the Commission.

The licensee shall, at all times, maintain and operate the nuclear facility within the limits of the OP&Ps and SOE. If operation outside the operating boundaries as defined in the OP&Ps and SOE is discovered, the licensee shall take immediate action to return the facility within the boundaries of safety analyses, in a safe manner.

The OP&Ps:

- define the operating rules consistent with the safety analyses and other licensing support documentation within which the station will be operated, maintained and modified, all of which should ensure nuclear safety;
- specify the authorities of the station staff positions to make decisions within the defined boundaries; and
- identify and differentiate between actions where discretion may be applied and where jurisdictional authorization is required.

Outage Management Performance

The licensee should manage all outage heat sink work activities in accordance with CSA N290.11, *Requirements for Reactor Heat Removal Capability During Outage of Nuclear Power Plants*.

The outage management performance SpA is not uniquely covered in the management system, CSA N286-12; however, many of the requirements of the management system, as well as other requirements in the licensing basis, are especially important during outages and should be considered together in determining the effectiveness of outage management performance. Consequently, the outage management performance SpA includes, as a minimum, the following review topics:

- Management system (LC 1.1);
- Reporting Requirements (LC 3.3);
- Fitness for service (LC 6.1);
- Radiation protection (LC 7.1);
- Conventional health and safety (LC 8.1);
- Heat sinks;
- Reactivity management; and
- Guaranteed shutdown state (GSS).

The maintenance program, see SpA for Maintenance under LC 6.1 shall include provisions for the management of planned outages.

The licensee's main core process that describes managing planned outages including heat sinks are:

- PRR-00660-OP-1, *Control and Monitor Station Equipment*; and
- SI-01365-P74, *Managing Planned Outages*.

The licensee's main core process that describes GSS is SDP-01368-P22, *Controlling the Guaranteed Shutdown State*. SDP-01368-P22 also describes that NB Power has an alternate Guaranteed Shutdown State called a Rod Based Guaranteed Shutdown State (RBGSS). Changes that are not in the less-conservative direction and may reduce safety margins would require prior notification and engagement of CNSC staff.

Regulatory Undertakings

Section 16 of Table A.1 of REGDOC- 3.1.1 (LC 3.3) requires the licensee to submit specific reports or notifications of regulatory undertakings, as follows:

- A notification of regulatory undertakings (NoRU) that identifies all regulatory undertakings to be completed during the outage within 60 days prior to the outage;
- A notification of any changes to the regulatory undertakings and commitments within 5 business days; and
- An outage completion assurance statement (OCAS) confirming that all regulatory undertakings were successfully completed during the outage within 30 days after the outage.

Heat Sinks

Heat sinks are combination of systems or portions of systems that contribute to conveying heat to the atmosphere or body of water. The goal of the heat sink systems is to provide heat removal from the heat source (reactor core, pump heat).

Outage heat sinks are defined and managed to ensure the plant is safe throughout the outage duration when the normal (at high power) heat sinks may not be available. Normal heat sinks are re-established as part of the plan to proceed to sustained high power operation.

Reactivity Management and Guaranteed Shutdown State (GSS)

The guaranteed shutdown state (GSS) is an application of physical barriers and procedural controls during an outage to guarantee that a shutdown reactor remains in sub-critical status.

The licensee shall provide prior WN for changes to operations or procedures for the Rod Based Guaranteed Shutdown State in accordance with LC G.2

Safe Operating Envelope

The SOE is considered part of the licensing basis. The SOE is defined in CSA N290.15 as “the set of limits and conditions within which the nuclear generating station must be operated to ensure compliance with the deterministic safety analysis for the design basis accidents upon which nuclear power plant operation is licensed and which can be monitored by or on behalf of the operator and can be controlled by

the operator on behalf of the operator when authorized by the operator.” The safe operating limits are derived from the safety analysis limits.

The SOE shall include the following limits and conditions:

- Safety analysis limits;
- Safe operating limits (derived from safety analysis);
- Conditions of operability;
- Actions and action times; and
- Surveillances.

The licensee’s SOE, listed in documents table, shall comply with the requirements set out in CSA N290.15 *Requirements for the safe operating envelope for nuclear power plants*.

Clause 7.9.1 of CSA N286-12 describes a requirement for having a safe operating envelope. See LCH Section 1.1 for version control of CSA N286-12.

The licensee’s main core processes that describe the safe operating limits, which are written notification documents listed under the management system in LCH Section 1.1, are:

- PRR-00660-MS-3, *Maintain Design and Safety Basis*, and
- PRR-00660-OP-1, *Control and Monitor Station Equipment*.

The SOE is considered part of the licensing basis. Changes to the SOE documentation are subject to LC G.1 and LC G.2. Changes in the less conservative direction require prior notification.

Power Limits

Power limit specifications set limits on parameters that affect reactor core, channel, and fuel bundle powers, to ensure compliance with limits imposed by the design and safety analyses. The magnitude of the initial reactor power, channel powers and bundle powers in the reactor prior to an accident are the fundamental parameters determining whether fuel or fuel channel failure will occur during anticipated transients and the postulated Design Basis Accidents (DBA).

The licensee’s main core process that describes reactor power limits is PRR-00660-MS-3, *Maintain Design and Safety Basis*, a written notification document listed under the management system in LCH Section 1.1.

In accordance with the safety analysis (refer to LCH Section 4.1) and the Licensing Basis (refer to LCH Section G.1), during operation:

- The total power generated in any one fuel bundle shall not exceed 935 kilowatts;
- The total power generated in any fuel channel shall not exceed 7300 kilowatts under steady-state operating conditions; and
- The total thermal power from the reactor fuel shall not exceed 2156 megawatts under steady-state operating conditions.

The reactor, channel and bundle power limits are considered safety and control measures. Any changes to them or planned operations outside of these limits are subject to LCH Section G.1.

In addition to the documents listed in this section, the licensee shall provide PN to CNSC staff prior to implementation, of any changes to any procedures that could potentially impact the reactor, the channel or the bundle power limits. Changes that would impact these limits are subject to LCH Section G.1.

Integrated Accident Management and Recovery (Severe Accident Management and Recovery and Accident Management and Recovery)

Accident management provisions are to ensure effective defences against radiological hazards resulting from DBAs. The licensee shall implement and maintain operational procedures for operation in all states analyzed in the design basis, including abnormal and emergency states. Clause 7.9.7 of the CSA N286-12 requires that procedures be prepared for non-routine and emergency conditions that require immediate action. See LCH Section 1.1 for version control of N286-12. The licensee has in place Abnormal Plant Operating Procedures to ensure that the operation of the facility can be returned to a safe and controlled state should operation deviate from normal operation.

The licensee's operational procedures ensure that the operation of the facility can be returned to a safe and controlled state should operation deviate from normal operation. The licensee shall ensure all abnormal operating scenarios analyzed in the design basis are accounted for in operational procedures (e.g. Abnormal Plant Operating Procedures (APOPs)) to mitigate situations that may arise which cause a deviation from the expected state. These documents are conceived to return the plant to a safe and controlled state and to prevent the further escalation of the abnormal incident into a more serious deviation. The licensee shall ensure clear instruction is provided directing operations in abnormal scenarios to the appropriate set of procedures.

The fundamental premise underlying accident management is that the licensee has established and maintained overlapping measures for accident prevention and, should an accident occur, is able to:

- Prevent the escalation of the accident;
- Mitigate the consequences of the accident; and
- Achieve a long-term safe stable state after the accident.

In addition to the operational procedures for abnormal and emergency states, the licensee shall implement and maintain a severe accident management program to address risks posed by severe accidents. The licensee shall also ensure clear instruction is provided directing operations to use an appropriate set of severe accident management guidelines (SAMGs), in the event an entry condition into a severe accident is met.

The licensee shall ensure clear instruction is provided directing operations in abnormal scenarios to the appropriate set of procedures or guides.

NB Power shall continue to implement 2015 version of CNSC REGDOC 2.3.2 *Accident management (version 2)*. This requirement could be aligned and integrated with the Emergency Preparedness and Fire Protection SCA for drills and exercises in accordance with the requirements of REGDOC 2.10.1 *Nuclear Emergency Preparedness and Response*. See LCH Section 10.1 for more information.

Procedures

REGDOC-2.5.1 *General Design Consideration: Human Factors* describes the elements of effective human factors verification and validation planning, including a suggested format for documenting these elements. A verification and validation plan documents the set of activities within a specific project that will be carried out to demonstrate that the human factors considerations of the project conform to accepted

human factors principles. This will ensure that the licensee enables personnel to perform their tasks safely and to meet operational goals.

Guidance Publications				
Source	Document #	Document Title	Implementation Date	Version
CNSC	REGDOC 2.5.1	General Design Considerations: Human Factors	Implemented	2019
CSA	N290.16	Requirements for beyond design basis accidents	Implemented	2016 (R2021)

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3.2 Approval to Restart After a Serious Process Failure

Licence Condition 3.2:

The licensee shall not restart a reactor after a serious process failure without the prior written approval of the Commission, or the prior written consent of a person authorized by the Commission.

Preamble:

A serious process failure is defined in REGDOC-3.1.1 as “A *failure of a process structure, system or component that leads to a systematic fuel failure or a significant release from the nuclear power plant, or that could lead to a systematic fuel failure or a significant release in the absence of action by any special safety system.*” Serious process failures are reportable in accordance with REGDOC-3.1.1, See LC 3.3.

Compliance Verification Criteria:

When an event is found to be a serious process failure or where the determination as to the cause and/or extent of condition has proved inconclusive (i.e. a serious process failure cannot be ruled out), a request for restart of the reactor shall be submitted in writing and approval to restart the reactor must be obtained from the CNSC in accordance with REGDOC 3.1.1 *Reporting Requirements: Nuclear Power Plants*. See LCH Section 3.3 for more information on reporting requirements.

If there is sufficient assurance that the cause of the serious process failure has been resolved and it is now safe to return the facility to service, a CNSC authorized person has the authority to give the consent to the licensee to proceed with the restart of the reactor.

The written request for restart of the reactor shall include the following information:

- description of the event;
- causes of the event;
- consequences and safety significance of the event;
- recovery plan including corrective actions, and fitness for service assessment on the systems/components impacted from the failure if applicable. This shall be completed prior to reactor restart;
- a statement regarding plant readiness to resume safe operation. This shall include any conditions that the licensee proposes to impose upon reactor restart and/or subsequent reactor operation to ensure safe operation of the nuclear facility; and
- extent of completion of the conditions mentioned in the statement regarding plant readiness to resume safe operation.

The licensee’s main core processes that describe the reporting requirements, which are written notification documents listed under the management system in LCH Section 1.1, are:

- PRR-00660-DM-4, *Assess and Improve Performance*, and
- PRR-00660-DM-2, *Manage External Relationships*.

Guidance:

In addition to the information listed above, the written request to restart a reactor after a serious process failure should also include the following information:

- a statement specifying that an extent of condition has been completed;
- documentation and communication to licensee staff (including additional training, if necessary);
and
- applicable historical Operating Experience (OPEX) review for comparable events.

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3.3 Reporting Requirements

Licence Condition 3.3:

The licensee shall notify and report in accordance with CNSC regulatory document [REGDOC 3.1.1, Reporting Requirements for Nuclear Power Plants](#).

Preamble:

CNSC regulatory document REGDOC 3.1.1 has comprehensive reporting requirements (scheduled and unscheduled) for the operation of NPPs. It describes information that the CNSC needs to evaluate the performance of the facilities it regulates. This document is complementary to the reporting requirements in the [Nuclear Safety and Control Act](#) and the associated regulations, as well as to the additional reporting that may be required by specific projects and activities.

Compliance Verification Criteria:

The licensee’s main core processes that describe the reporting requirements, which are written notification documents listed under the management system in LCH Section 1.1, are:

Document #	Title	Prior Notification
PRR-00660-DM-4	Assess and Improve Performance	No
PRR-00660-DM-2	Manage External Relationships	No

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 3.1.1	Reporting Requirements: Nuclear Power Plants	2016 (V2)	Implemented

CNSC staff will evaluate whether the reporting requirements as specified by REGDOC-3.1.1 are met as part of the reporting and trending SpA; however, the most applicable SCA and SpA will be used to evaluate the information reported. In addition, information provided in accordance with REGDOC-3.1.1 will be evaluated under the Management System SCA (LC 1.1) and the SpA for performance assessment, improvement and management review, which includes assessment, self-assessment, independent assessment and problem identification and resolution.

Updates to facility descriptions are required every 5 years or when requested by the CNSC in accordance with REGDOC-3.1.1

The following reports relate to the following sections of the LCH:

Quarterly Reports

- Safety Performance Indicators (applies to multiple SCAs/LCs);
- Nuclear Power Plant Pressure Boundaries (LC 5.2);
- Nuclear Power Plant Personnel (LC 2.4);
- Operational Security (LC 12.1);

Annual Reports

- Environmental Protection (LC 9.1);
- Research and Development (LC 4.1);
- Risk and Reliability (LC 7.1); and
- Fuel Monitoring and Inspection (LC 5.1).

Scheduled Specific Periodic Reports

- Updates to Facility Descriptions (LC G.3 and 5.1) and Final Safety Analysis Report (LC 4.1);
- Probabilistic Safety Assessment (LC 4.1);
- Site Environmental Risk Assessment (LC 9.1);
- Station Security Report (LC 12.1); and
- Proposed Decommissioning Plan (LC 11.2).

Event Reports and Notifications

- Preliminary Event Reports and Immediate Notifications (applies to multiple SCAs/LCs); and
- Detailed Event Reports (applies to multiple SCAs/LCs).

Events shall be assessed and reported per Event Notifications criteria as specified in Appendix A of REGDOC-3.1.1 and as clarified in CNSC document “*Interpretation of REGDOC-3.1.1 Reporting Requirements for Nuclear Power Plant*” Rev. 0, provided in CNSC letter e-Doc 4860161.

Specific reporting provisions for outages under Situation No. 16 (a. to c.) in Table A.1 in REGDOC-3.1.1 refer to notifications for regulatory undertakings (NoRU) regarding:

- regulatory undertakings that will be completed during outages;
- changes to regulatory undertakings; and
- outage completion assurance statements (OCAS) confirming all regulatory undertakings were completed during the outage.

Regulatory undertakings for outages are included in the SpA for outage management performance under LC 3.1.

When reporting per the requirements under Situation/Event No. 18 in Table A.1 in REGDOC-3.1.1, the licensee shall include any non-compliance of applicable law at the federal, provincial or municipal level that pertains to the activities licensed under this licence and that has consequences for the environment, health and safety of persons, national security and/or compliance with international obligations to which Canada has agreed. It is unnecessary to report trivial non-compliances.

Sealed source tracking reports shall be filed under Situation/Event No. 25 in Table A.1 in REGDOC-3.1.1 within 48 hours of receipt or import.

Guidance:

To ensure consistency of reporting across the fleet of Canadian NPPs, CNSC staff has issued a list (e-Doc 4525925) that provides additional clarification and interpretation of the requirements of REGDOC-3.1.1. The list was developed in consultation with industry and should accordingly be used as guidance.

Guidance Publication			
Source	Document #	Document Title	Version
CNSC	e-Doc 4525925	Interpretation of REGDOC 3.1.1 Reporting Requirements for Nuclear Power Plants	Rev. 1

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4 SCA – SAFETY ANALYSIS

4.1 Safety Analysis Program

Licence Condition 4.1:

The licensee shall implement and maintain a safety analysis program.

Preamble:

A deterministic safety analysis (DSA) evaluates the NPP responses to events by using predetermined rules and assumptions (conservative or best-estimate methods). DSA allows predicting the extent of potential loads, such as temperatures and pressures, on reactor system and structures in assumed accident scenarios. REGDOC-2.4.1 sets out the objectives and requirements for DSA.

Probabilistic safety assessment (PSA) is a comprehensive and integrated assessment of the safety of the nuclear power plant that, by considering the initial plant state and the probability, progression, and consequences of equipment failures and operator response, derives numerical estimates of a consistent measure of the safety of the design. Such assessments are most useful in assessing the relative level of safety. The objectives of the probabilistic safety analysis are stated in REGDOC 2.4.2.

CSA standard N286.7 *Quality Assurance of Analytical, Scientific and Design Computer Programs for Nuclear Power Plants* provides the specific requirements related to the development, modification, maintenance and use of computer programs used in analytical, scientific and design applications. These requirements apply to the design, development, modification and use of computer programs that are used in analytical, scientific and design applications at nuclear power plants.

The safety analysis SCA includes the following SpAs:

- Deterministic safety analysis;
- Hazard assessment;
- Probabilistic safety assessment (PSA);
- Criticality safety;
- Severe accident analysis; and
- Management of safety issues (including R&D).

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure safety analysis and probabilistic safety analysis as set out in the licensing basis (LCH Section G.1).

Document #	Title	Prior Notification
PRR-00660-MS-3	Maintain Design and Safety Basis	No

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC-2.4.1	Deterministic Safety Analysis	2014 ^a	Implemented for new analysis
CNSC	REGDOC-2.4.2	Probabilistic Safety Assessment (PSA) for Nuclear Power Plants	2014	Implemented
CSA	N286.7	Quality assurance of analytical, scientific and design computer programs for nuclear power plants	1999 ^b	Implemented
AECB	1059	Reactor Licensing and Safety Requirements, Hurst and Boyd	1972	Implemented

^aA complete implementation of REGDOC 2.4.1, *Deterministic Safety Analysis*, is planned by 2024, April 29.

^bCSA standard N286.7, *Quality assurance of analytical, scientific and design computer program for nuclear power plants* was published in 2016. NB Power to implement this by 2022, December 31. CNSC staff will verify compliance through its oversight activities.

Deterministic Safety Analysis

The licensee's main core process which describes the deterministic safety analysis is PRR-00660-MS-3, *Maintain Design and Safety Basis*. Clause 7.4 of CSA N286-12 identifies requirements needed to address safety analysis. See LCH Section 1.1 for version control of CSA N286-12.

The safety report shall be reviewed and updated as per REGDOC 3.1.1 and REGDOC 2.4.1 requirements.

The licensee shall conduct and maintain a deterministic safety analysis in accordance with applicable requirements and reflecting the actual plant design and conditions. The deterministic safety analysis must demonstrate that the radiological consequences of the postulated initiating events involving a single process failure and events involving a single process failure in conjunction with the failure of one of the special safety systems do not exceed the accident-dependent reference public dose limits in the table below.

	Individual Dose Limit		Population Dose Limit	
	Thyroid Dose (mSv)	Whole Body Dose (mSv)	Thyroid Dose (Person mSv)	Whole Body Dose (Person mSv)
Single Failure	30	5	10 ⁵	10 ⁵
Dual Failure	2500	250	10 ⁷	10 ⁷

NB Power, along with industry partners, has developed a set of derived acceptance criteria (DAC) for slow events, as documented in COG-13-9035-R00, *Derived Acceptance Criteria for Deterministic Safety Analysis*. This DAC were reviewed and accepted by CNSC staff (e-Doc 4951240) and shall be used by NB Power when conducting deterministic safety analysis.

All new analyses will be performed in accordance with REGDOC 2.4.1. Recognizing that full implementation of REGDOC 2.4.1 may not be practicable or provide substantial safety benefit beyond the current safety case; a method of evaluating the significance of gaps (applying a graded approach) against REGDOC 2.4.1 and their importance to safety shall be established and applied on an as-needed basis to determine if corrective actions are required.

NB Power has developed an implementation plan, based on gap assessments with respect to compliance with REGDOC-2.4. 1. On December 19, 2018 NB Power submitted a revision of the Point Lepreau REGDOC-2.4.1 Implementation Plan (IR-03500-116, ver2), which has been accepted by CNSC staff on February 11, 2021 (e-Doc 6485412).

Criteria for implementation of REGDOC 2.4.1 include the following elements:

- Assessment of the current safety analysis practices against REGDOC 2.4.1 to identify gaps;
- Prioritization of the identified gaps using formal methods;
- Justification of non-conformances (e.g., full compliance with REGDOC 2.4.1 is not practicable or does not provide a demonstrable safety benefit); and
- Development and execution of corrective action plans to address the important gaps.

Single Failure Criterion Application and Consistency with the Design Basis in Deterministic Safety Analysis

Existing CANDU NPPs were designed to earlier standards and regulatory requirements. As part of the systematic review process, facilities are reviewed against modern codes and standards to identify acceptable deviations and practicable upgrades when required. When undertaking DSA for a Postulated Initiating Event (PIE) where the application of Single Failure Criterion (SFC) is required, and if compliance with the SFC cannot be demonstrated with the existing design basis, a Risk Informed Decision Making (RIDM) assessment shall be applied and submitted to CNSC for acceptance, on a case by case basis.

The analysis of AOO and DBA for demonstrating Level-3 DiD should apply the SFC to each safety group. Application of SFC is not required for the analysis of AOO for demonstrating Level-2 DiD and for the analysis of DEC.

Inclusion of the SFC in DSA for Point-Lepreau NGS is not required for:

- components that are not required to a change state and which do not depend on safety support equipment to perform their design functions, For example, check valves that are not required to a change state during a PIE.
- withdrawal from service of components for limited periods (as permitted by the operational limits and conditions) for the purposes of maintenance, testing, inspection, or repair (MTIR), in addition to a single failure of a component.
- passive components consisting of vessels, cables, piping other than sensing lines and seals.

Hazard Analysis

A hazards analysis is used to demonstrate the ability of the design to effectively respond to common-cause events by confirming that the NPP design incorporates sufficient diversity and physical separation to cope with these events. It also confirms that credited SSCs are qualified to survive and can function as required during the event.

For Point-Lepreau NGS, hazard analysis is conducted as an initial step to probabilistic safety assessments. This involves the assessment and screening of various types of hazards: internal and external hazards, naturally occurring and human-induced, but non-malevolent. Based on the hazard screening process, PSAs are developed for internal events, internal floods, internal fires, and seismic events.

Probabilistic Safety Analysis

The licensee's main core process that describes the probabilistic safety analysis is PRR-00660-MS-3, *Maintain Design and Safety Basis*. NB Power's PSA program is described in IR-03610-03, *Probabilistic Safety Assessment Program*.

NB Power has submitted the update PSA methodologies in accordance with REGDOC 2.4.2. . These methodologies were accepted by CNSC staff and meet the REGDOC 2.4.2 requirements. NB Power shall update PSA models every 5 years (the next due date is November 2026) or sooner if there are significant changes in the plant design or operation. In addition, NB Power shall ensure the outcomes that are credited in the PSA studies be implemented in the field.

Criticality Safety

Criticality safety focuses on the prevention of the criticality of fuel outside of the core, for either new or irradiated fuel.

The Point-Lepreau NGS reactor uses natural uranium fuel which cannot achieve a criticality in air or in light water. New fuel is stored in such a manner that it cannot be made critical.

Irradiated natural uranium fuel is stored under light water and cannot be made critical in any configuration; therefore no criticality risk exists in the spent fuel bay of Point-Lepreau NGS.

Design and Analysis Computer Codes and Software

The licensee shall demonstrate compliance of computer programs used in analytical, scientific and design applications used to support the safe plant operation in accordance with N286.7, *Quality assurance of analytical, scientific and design computer programs for nuclear power plants*.

The licensee's main core processes that describe the design and analysis computer codes and software, which are written notification

- PRR-00660-MS-1, *Develop Modifications*, and
- PRR-00660-MS-3, *Maintain Design and Safety Basis*.

In addition, the licensee documents specific to the design and analysis of computer codes and software are included in the documents table below.

Beyond Design Basis Accidents / Severe Accidents Analysis

REGDOC-2.4.1 provides the requirements for the performance of a safety analysis for Beyond Design Basis Accidents (BDBA), including severe accidents. The requirements in REGDOC 2.4.1 are used to produce best estimate BDBA and severe accidents analysis rather than conservative analysis as in AAOs and DBAs.

Severe accidents represent the set of accidents under beyond design basis accidents that involve significant fuel degradation, either in core or in fuel storage.

BDBA analysis is performed to ensure that prevention and mitigation measures are identified. The analysis can identify challenges to the plant presented by such events and identify equipment that can be included in the severe accident management guidelines.

The following, but not limited to, can be considered as analysis of BDBA / Severe Accident Analysis:

- Analysis of low-probability ($<10^{-5}$) dual-failure events included in the current Safety Reports;
- Recent assessments that consider the conditions beyond the plant original design basis (e.g., sensitivity cases recently performed for low-probability CME);
- MAAP-CANDU severe accident analyses as part of Level 1 and Level 2 PSA; and
- MAAP-CANDU severe accident analyses to support the severe accident management technical basis.

Management of Safety Issues (including R&D Programs)

The management of safety issues SpA includes the following review topics:

- Research and Development (Clause 7.11.3 of CSA N286-12); and
- CANDU Safety Issues.

A Research and Development report is submitted annually in accordance with REGDOC-3.1.1 (see LC 3.3). CNSC staff continue to undertake systematic evaluations of NB Power's research and development (R&D) activities, as submitted to CNSC staff through annual reporting in accordance with clause 3.6 of REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*. These evaluations confirm that NB Power maintains a robust R&D capability to address any emerging issues

CNSC staff will track progress on the ongoing R&D topics through annual reporting under REGDOC-3.1.1.

There are currently 3 Category 3 CANDU Safety Issues (CSI) that are still open for NB Power. They are as follows:

- AA9 - analysis for void reactivity coefficient
- PF9 - fuel behaviour in high temperature transients
- PF10 - fuel behaviour in power pulse transients

The systematic application of the RIDM process for the identification of a path forward and resolution of the remaining CSIs, along with on-going regulatory research and taking operation experience into account are key aspects of the overarching safety principle of continuous safety improvement.

Document #	Document Title	Prior Notification
0087-01322-3009-001-SR-A	PLNGS – Unit 1 Safety Report: Part 1 – Design Description	Yes
0087-01322-3009-002-SR-A	PLNGS – Unit 1 Safety Report: Part 2 – Accident Analysis, Vol. 1 to 3	Yes
0087-01322-3009-003-SR-A	Safety Report: Part 3 – Appendices	Yes
SDP-01368-SA01	Performing Safety Analysis	No
IR-78600-SAMG-11 & 12	Technical Basis for CANDU Severe Accident Management, Volumes 1 and 2 (Confidential)	No
IR-03610-03	Probabilistic Safety Assessment Program	No
SI-01365-T83	Developing and Modifying Analytical, Scientific and Design Computer Programs	No
SI-01365-T84	Implementing Analytical, Scientific, and Design Computer Programs	No

Guidance:

Deterministic Safety Analysis

Guidance for considering DSA of wet and interim dry storage for irradiated fuel and other radioactive materials, See LCH Section 11.1 for version control of N292.1 and N292.2.

The licensee should use the detailed methodologies and derived acceptance criteria for the conduct of DSA described in the COG documents included as guidance publications.

Guidance Publications		
Document #	Document Title	Revision #
COG-09-9030	Principles & Guidelines For Deterministic Safety Analysis	Rev. 3
COG-11-9023	Guidelines for Application of the Limit of the LOE/ROE Methodologies to Deterministic Safety Analysis	Rev. 1
COG-06-9012	Guidelines for Application of the Best Estimate Analysis and Uncertainty (BEAU) Methodology to Licensing Analysis	Rev. 1

Guidance Publications		
Document #	Document Title	Revision #
COG-08-2078	Principles and Guidelines for NOP/ROP Trip Setpoint Analysis for CANDU Reactors	Rev. 1
COG-13-9035	Derived Acceptance Criteria For Deterministic Safety Analysis	Rev. 1

Updates to DSA should contain a revision summary sheet highlighting the key differences between the existing analyses and updated analysis. The revision summary should include:

- Summary of changes (key differences) such as:
 - in acceptance criteria,
 - in event characterization,
 - in safety analysis assumptions,
 - in methodology, or elements of a methodology,
 - in plant models,
 - in use of computer codes and embedded models, and
 - in trip coverage.
- Reasons for updating the analysis and for updating models, assumptions, initial conditions or boundary conditions;
- Significance of changes, and their justification;
- Significant changes in results that may affect the conclusions of the analysis for the design; operational or emergency safety requirements for a particular situation or event; and
- Impact on operating and safety margins.

The licensee should maintain a Safety Report Basis consisting of a listing of Analysis of Record Items and auxiliary documents. The licensee should continue to provide CNSC staff with regular updates of the list indicating the submissions to be included in the next Safety Report update (Part 3).

When the deterministic safety analysis methodology is modified as a result of improved knowledge, or to address emerging issues, the licensee should assess the impact of such a modification on the operating limits, as well as procedural and administrative rules.

The licensee should not credit results obtained with a modified safety analysis methodology to relax operating conditions and/or change safety margins until the modification of the methodology has been reviewed by CNSC staff. If CNSC staff indicates that the modified methodology is appropriate, the licensee must still fulfill any other requirements or criteria associated with the changes to the operating conditions or safety margins, as documented under other LCs such as those in LCH Section 3.

Probabilistic Safety Analysis

Guidance documents to be used for the development or update of PSA are listed in REGDOC 2.4.2. A revision summary of the updated probabilistic safety assessments should be developed in accordance with the guidance provided in Section 4.2 of REGDCOC 3.1.1. Periodic updates of the PSA should follow the guidance given in CSA N290.17, Probabilistic Safety Assessment for Nuclear Power Plants.

Design and Analysis Computer Codes and Software

In addition to industry standards, CNSC staff will refer to the applicable industry verification and validation process practices related to computer codes and software used to support the safe plant operation.

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5 SCA – PHYSICAL DESIGN

The physical design SCA includes the following SpAs:

- Design governance (LC 5.1);
- Site characterization (LC G.3, 4.1, 5.1);
- Facility design (LC G.3 and 5.1);
- Structure design (LC 5.1);
- System design (LC 5.1, 5.2, 5.3 10.2); and

5.1 Design Program

Licence Condition 5.1:

The licensee shall implement and maintain a design program.

Preamble:

A design program ensures the designs of both the nuclear plant and waste storage facilities are managed using a well-defined systematic approach. Implementing and maintaining a design program confirms that safety-related SSCs and any modifications to them continue to meet their design bases given new information arising over time and taking changes in the external environment into account. It also confirms that SSCs continue to be able to perform their safety functions under all plant states. An important cross-cutting element of a design program is design basis management.

A design program should be composed of elements that consider topics including but not limited to: pressure boundary design, civil structure design, environmental qualification of equipment, seismic design, mechanical design, fuel design, core nuclear design, core thermal-hydraulic design, safety system design, fire protection design, electrical power system design, as well as instrumentation and control system design.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure the design as set out in the licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N290.12	Human factors in design for nuclear power plants	2014 (R2019)	Implemented
CSA	N291	Requirements for safety-related structures for CANDU nuclear power plants	2008 ^a & Update 1 & Update 2	Implemented

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N290.14	Qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants	2015 ^b	Implemented

^aCSA standard N291, *Requirements for safety-related structures for CANDU nuclear power plants* was published in 2015. NB Power to implement this by 2022, March 31. CNSC staff will verify compliance through its oversight activities.

^bCSA standard N290.14, *Qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants (R2020)*: NB Power plans compliance by 2022, April 30. CNSC staff will verify compliance through its oversight activities.

Design Governance

The design governance SpA includes the following review topics and requirements from CSA N286-12:

- Design Program:
 - Design process (Clauses 7.3, 7.3.1);
 - Design inputs (Clauses 7.3.2, 7.3.2 (a) to (t));
 - Design requirements (Clause 7.3.3);
 - Tools (Clause 7.3.4 as well as CSA N286.7);
 - Design (Clause 7.3.5);
 - Documents (Clause 7.3.6, 7.3.6 (a) to (g)); and
- Human factors in design (Clause 7.3.2 (k), as well as CSA N290.12).

The licensee main core processes that describe the design program including design modification approvals, which are written notification documents listed under the management system in LCH Section 1.1, are:

- PRR-00660-MS-1, *Develop Modifications*,
- PRR-00660-MS-2, *Implement Modifications*,
- PRR-00660-MS-3, *Maintain Design and Safety Basis*, and
- PRR-00660-DM-2, *Manage External Relationships*.

In addition to these core processes the licensee design program should provide a table or roadmap that identifies relevant design basis documents, design sub-programs and processes that are maintained by the licensee.

The design descriptions for the nuclear facility and the waste storage facility are summarized in the Safety Reports. See LCH Section 4.1 and 16.1 for prior written notification of Safety Reports for these facilities.

The design of the existing nuclear facility including safety-related SSCs and any modification shall comply with applicable codes, standards and regulations including adequate consideration of human factors principles and practices in order to minimize the potential for human error and promote safe and reliable system performance through the consideration of human factors in the design of facilities, systems, and equipment. Modification to the design of existing safety-related structures and components shall include adequate consideration for human factors in accordance with CSA N290.12, HUMAN FACTORS IN DESIGN FOR NUCLEAR POWER PLANTS.

The design basis for reliability targets shall meet the requirements in REGDOC-2.6.1 (LC 6.1).

The licensee shall ensure all safety-related SSCs are designed to perform their required functions under all plant states for which the system must remain available. NB Power shall ensure any modifications made to the facility are completed in accordance with NB Power engineering change control process, and CSA standards.

The licensee shall ensure that plant design and changes to plant design are accurately reflected in the safety analysis. Furthermore, the licensee shall ensure that plant status changes (design modifications) are controlled such that the plant is maintained and modified within the limits prescribed by the design and licensing basis.

The licensee shall ensure that plant status changes (design modifications) are controlled such that the plant is maintained and modified within the limits prescribed by the design and licensing basis. Aspects of design are considered safety and control measures if changes to them could:

- invalidate the limits documented in the operating policies and principles or safe operating envelope referred to in LCH Section 3.1;
- introduce hazards different in nature or greater in probability or consequence than those considered by the safety analyses and probabilistic safety assessment; and/or
- adversely impact other important safety and control measures, such as those related to operations, radiation protection, emergency preparedness, etc.

The licensee shall ensure that any changes to those aspects remain within the limits established by the licensing basis. Changes affecting the licensing basis (including those that would invalidate limits or introduce different hazards) require prior written approval by the Commission.

The design program should minimize the potential for human error and promote safe and reliable system performance through the consideration of human factors in the design of facilities, systems, and equipment.

For proposed modifications, modern requirements that are consistent with the current licensing basis of the plant shall be applied to the extent practicable.

Site Characterization

The site characterization SpA includes the following review topics and requirements from CSA N286-12:

- Site selection (Clauses 7.2, 7.2 (a) to (f)) also see SpA for Hazard Analysis (LC 4.1);
- Relevant:
 - environmental assessments, environmental impact statements, geological, geotechnical, seismological, hydrological, hydrogeological and meteorological data;
 - site plan and description, and site reference data (LC G.3);
 - exclusion zone authority and control (LC G.3); and
 - proximity of industrial, transport and military facilities (LC G.3).

Facility Design

The facility design SpA includes the following review topics:

- Layout of the facility (LC G.3); and
- Site plan and description (LC G.3).

The licensee document that contains the facility description and the final safety analysis report is cited under LCs G.3 and 4.1, respectively.

Structure Design

The structure design SpA includes the following review topics:

- Structure design and modification (including repairs), which includes but is not limited to the following:
 - Concrete containment structures; and
 - Safety-related structures (CSA N291).

Any gaps identified with respect to N291-15 are subject to the disposition and/or corrective actions and should be reported to CNSC.

System and Component Design

The system design SpA includes the following review topics:

- System design, which includes but is not limited to the following systems or specialized areas:
 - Pressure boundary program CSA N285.0 (LC 5.2);
 - Safety systems, including shutdown systems, emergency core cooling systems, and containment system
 - Reactor control systems, Electrical power and instrument air systems
 - Monitoring and display of nuclear power plant safety functions in the event of an accident
 - Fuel bundles and fuel assemblies;
 - Seismic design and qualification (CSA N289.1 – N289.5) (LC 5.3);
 - Environmental qualification of equipment (CSA N286-12 Clause 7.3.2 (e), CSA N290.13) (LC 5.3); and
 - Fire protection systems (CSA N293) (LC 10.2).

Compliance verification criteria for the pressure boundary design (program), new fuel design and equipment and structure qualification program are in LCH Sections 5.2 and 5.3 respectively. Fire protection design is generally covered under the design program, but is more specifically addressed as compliance verification criteria for CSA N293 in LCH section 10.2 and for CSA N393 in LCH section 15.3

Special Safety Systems (SSS)

Modification of the special safety systems (Shutdown System 1, Shutdown System 2, Emergency Core Cooling System and Containment System) or significant changes to systems connected to the special safety systems (e.g. change that would impact safety margins) would require prior notification and engagement of the CNSC. When reviewing such changes, CNSC staff will use the criteria in Appendix A of the CNSC process document *Assessing licensee changes to documents or operations* (e-Doc 4055483) and any other applicable criteria. Changes of the licensing basis in a potentially unsafe direction would require prior written approval by the CNSC. Prior notification is not required for changes to items that

serve the same functional characteristics of the originally designed item and does not result in a change to operating procedures or safety system testing.

The licensee shall have sub-program elements that address the design and modification of safety related structures in accordance with the requirements of CSA standard N291 *Requirements for Safety Related Structures for CANDU Nuclear Power Plants* and concrete containment structures in accordance with the requirements of CSA standard N287.7 *In-service Examination and Testing Requirements for Concrete Containment Structures for CANDU Nuclear Power Plants* in LCH Section 6.1. The design and modification of concrete containment structures stemming from in-service examination and testing shall be made in accordance with the requirements in CSA standards N287.7. See LCH CVC of Section 6.1 for applicable versions of CSA standard N287.7. In the event design and modifications are required to concrete containment structures and safety-related structures NB Power should demonstrate compliance with the latest version of CSA standard N287 suite of standards, or justify an alternative, in advance as these proposed changes would not be considered as part of the current licensing basis. See LCH Sections G.1 and G.2 for more information.

Electrical Power Systems and Instrumentation and Control (I&C) Systems

The plant electrical power system design shall include the safety classifications of the systems. Its design shall be adequate for all modes of operation under steady-state, voltage and frequency excursions, and transient conditions, as confirmed by electrical analysis. The electrical power systems shall be monitored and tested to demonstrate compliance with the design requirements and to verify the operability of AC systems and DC systems.

The licensee shall ensure the plant overall instrumentation and control (I&C) system and electrical power systems is designed to satisfy the following:

- Plant level system classification;
- Separation requirements between the groups and channels;
- Safety features for enhancing system reliability and integrity are identified and implemented in the design, for example, fail safe design, redundancy, independence and testing capability
- System is not vulnerable to common cause failures; and
- I&C and electrical power systems of safety systems meet the requirements of required reliability and design performance.

The licensee shall demonstrate survivability of the I&C systems and component that are critical to the management of Beyond Design Basis Accidents (BDBAs), and the availability of power supply to necessary equipment and associated I&C for BDBAs.

Reactor Core Design

The licensee shall update and maintain the reactor core nuclear design information found in the safety report and supporting design manuals. Core surveillance activities shall be implemented to ensure compliance with reactor core nuclear design and operation within the design envelope. Significant changes to core nuclear design would require prior notification and engagement of CNSC. When reviewing such changes, CNSC staff will use the criteria in Appendix A of e-Doc 4055483 and any other applicable criteria.

Changes outside the reactor core nuclear design basis would require prior written approval by the Commission.

The licensee shall ensure configuration management is aligned with the design and safety analysis and incorporated into purchasing, construction, commissioning, operating and maintenance documentation. Conformance is to be maintained between design requirements, physical configuration and facility configuration information. The licensee shall establish a design authority function with the authority to review, verify, approve (or reject), document the design changes and maintain design configuration control.

Fuel Bundles

Fuel bundles and fuel assemblies are important examples of designs that are considered safety and control measures. Prior to making use of a new fuel bundle/fuel bundle string or fuel assembly design in the reactor, NB Power shall perform design verification activities, analyses and testing to demonstrate that design requirements are met. When considering possible design changes to fuel bundles and fuel assemblies, the licensee shall engage CNSC staff early enough to confirm that the changes are within the licensing basis before implementing the change. The length and complexities of those activities depend on the novelty of the design.

The annual report on fuel monitoring and inspection is submitted in accordance with REGDOC-3.1.1 (See LC 3.3). The details of this report are relevant to this SpA whereas the compliance with REGDOC-3.1.1 is considered to be part of the reporting and trending SpA (LC 3.3).

Component Design

Compliance verification criteria set out for system design also apply to component design.

Document #	Document Title	Prior Notification
EXP-08700-0007	Engineering Expectations	No
SDP-01340-DS05	Modification Design Requirements	No
SI-01365-T073	Responding to Requests for Design Modifications	No
IR-03100-51	Core Surveillance and Testing Report: Post-Refurbishment Startup 2012	Yes

Guidance:

Design Governance:

The design program should include, but is not limited to the following:

- Safety objectives, which include general nuclear safety objectives, radiation protection objectives, technical safety objectives and environmental protection objectives;
- Safety goals, which include qualitative and quantitative safety goals, core damage frequency, and small and large release frequencies;
- The identification of the design authority for the overall design (see also SpA for Organization under LC 1.1.). The design authority should have the authority to review, verify, approve (or reject), document the design changes and maintain design configuration control;

- The design approach for defence-in-depth including the approach adopted to include multiple and (to the extent practicable) independent levels and barriers for defence for all operational states including accidents;
- A systematic process throughout the design phase to show that the design meets all relevant safety requirements, and that the plant design process has followed proven engineering practices;
- Fundamental safety functions incorporated into the design including SSCs used to perform necessary safety functions; and
- Considerations for robustness against malevolent acts.

Guidance is found in the documents listed in the table below. Guidance for considering human factors in design programs is provided in CNSC regulatory document REGDOC-2.5.1, General Design Considerations: Human Factors.

Guidance Documents

Source	Document #	Document Title	Version
CNSC	REGDOC 2.5.2	Design of Reactor Facilities: Nuclear Power Plants	2014
CSA	N287.1	General requirements for concrete containment structures for nuclear power plants	2014 (R2019)
CSA	N287.2	Material requirements for concrete containment structures for CANDU nuclear power plants	2008 ^a
CSA	N287.3	Design requirements for concrete containment structures for nuclear power plants	2014
CSA	N287.4	Construction, fabrication, and installation requirements for concrete containment structures for CANDU nuclear power plants	2009 (R2014)
CSA	N287.5	Examination and testing requirements for concrete containment structures for nuclear power plants	2011
CSA	N290.0	General requirements for safety systems of NPPs	2017 ^b
CSA	N290.1	Requirements for the shutdown systems of nuclear power plants	2013
CSA	N290.2	Requirements for emergency core cooling systems for nuclear plants	2011 ^c
CSA	N290.3	Requirements for the containment system of nuclear power plants	2016
CSA	N290.4	Requirements for reactor control systems of nuclear power plants	2011 ^d
CSA	N290.5	Requirements for electrical power and instrument air systems of CANDU nuclear power plants	2006 ^e
CSA	N290.6	Requirements for monitoring and display of nuclear power plant safety functions in the event of an accident	2009 ^f
UFC	3-340-02	Structures to Resist the Effects of Accident Explosions	2014
CNSC	REGDOC 2.5.1	General Design Considerations: Human Factors	2019

Source	Document #	Document Title	Version
CNSC	REGDOC 1.1.3	Licence Application Guide: Licence to Operate a Nuclear Power Plant	2017

^aCSA N287.2 Material requirements for concrete containment structures for CANDU nuclear power plants, version 2017 is planned for implementation by 2023, March 31.

^bCSA N290.0 General requirements for safety systems of NPPs version 2017 is planned for implementation by 2022, March 31.

^cCSA N290.2 Requirements for emergency core cooling systems for nuclear plants version 2017 is planned for implementation by 2022, March 31.

^dCSA standard N290.4, Requirements for reactor control systems of nuclear power plants was published in 2019. Compliant – except 4.16.1 & 4.16.2 clauses - require PLNGS to be compliant with CSA N290.4-16 which will be implemented by 2030, December 31 (PSR – IIP).

^eCSA standard N290.5, Requirements for electrical power and instrument air systems of CANDU nuclear power plants was published in 2016. Compliance by 2030, December 31.

^fCSA standard N290.6, Requirements for monitoring and display of nuclear power plant safety functions in the event of an accident was published in 2016. Compliance by 2022, December 31.

NB Power is to submit implementation dates for N290.4, N290.5 and N290.6. CNSC staff will verify compliance through its oversight activities.

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5.2 Pressure Boundary Program

Licence Condition 5.2:

The licensee shall implement and maintain a pressure boundary program and have in place a formal agreement with an Authorized Inspection Agency.

Preamble:

This licence condition provides regulatory oversight with regards to the licensee implementation of a pressure boundary program and holds the licensee responsible for all aspects of pressure boundary registration and inspections.

Pressure boundary is defined as a boundary of any pressure-retaining vessel, system or component of a nuclear or non-nuclear system, where the vessel, system or component is registered or eligible for registration.

A pressure boundary program is comprised of the many programs, processes and procedures and associated controls that are required to ensure compliance with all the requirements of CSA N285.0. This LC also ensures an Authorized Inspection Agency (AIA) will be subcontracted directly by the licensee. An AIA is an organization recognized by the CNSC as authorized to register designs and procedures, perform inspections, and other functions and activities as defined by N285.0 and its applicable referenced publications. The AIA shall have in place a documented quality program for the provision of inspection and oversight of CSA N285.0 for the activities performed at the NPP. The AIA quality program shall be accepted by the licensee and CNSC.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure the pressure boundary as set out in the licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N285.0 ^a (combined with N285.6)	General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material Standards for reactor components for CANDU nuclear power plants	2017	Implemented

^aCSA N285.0 includes references to other applicable codes and standards. Any additional CSA or ASME code references are included in the list only if they are not the version referred to in CSA N285.0.

The licensee pressure boundary program is comprised of many programs, processes and procedures under the NMM-00660 “Nuclear Management Manual” to ensure compliance with CSA N285.0. See LCH Section 1.1 for more information on the *Nuclear Management Manual*. The licensee shall maintain a Pressure Boundary Program roadmap in compliance with Annex N of CSA N285.0. IR-00911-01, CSA

N285.0 Pressure Boundary Program Roadmap is the NBP roadmap that describes the documents that make up the NBP pressure boundary program.

The licensee shall operate vessels, boilers, systems, piping, fittings, parts, components, and supports safely and keep them in a safe condition. NB Power shall:

- follow work plans and procedures, accepted by the AIA, to test, maintain, or alter over-pressure protection devices;
- comply with operating limits specified in certificates, orders, designs, overpressure protection reports, and applicable codes and standards; and
- have any certified boiler or vessel that is in operation or use inspected and certified by an authorized inspector according to an accepted schedule.

Personnel conducting non-destructive examinations shall be certified in accordance with the edition of CAN/CGSB 48.9712/ISO 9712 currently adopted for use by the National Certification Body (NCB) of Natural Resources Canada for the appropriate examination method. If the NCB does not offer certification for a specific inspection method, the relevant alternate requirements of Clause 11.3 of CSA N285.0 shall apply to ensure that personnel are appropriately trained and qualified.

Classification, Registration and Reconciliation Procedures

Licensee procedures describing the classification, registration and reconciliation processes and the associated controls shall form part of the pressure boundary program. The licensee shall provide prior notification of any changes to the procedures describing the classification, registration and reconciliation processes.

Overpressure Protection Reports

The licensee shall provide WN to CNSC staff, of new or revised overpressure protection reports, after the final registration of the system.

Classification and Registration of Fire Protection Systems

Fire protection systems and associated fittings and components are to be classified at least as Code Class 6, designed to the American Society of Mechanical Engineers (ASME) B31.1 and registered, unless the exemption criteria noted below are met.

The following fittings and components may be exempt from requiring a Canadian Registration Number (CRN) provided they meet the following exemption criteria:

- fittings and components that are cUL or ULC listed and suitable for the expected environmental conditions and maximum pressure; or
- pressurized cylinders and tubes, such as extinguishers, inert gas and foam tanks, that bear Transport Canada approvals and suitable for the expected environmental conditions and maximum pressures; or
- buried fire protection piping that is in compliance with NFPA-24.

Buried fire protection piping designed to the ASME piping code may be exempt from the ASME pressure testing requirements if the pressure testing is performed to NFPA-24.

The requirements of CSA N285.0 apply for components higher than Code Class 6.

Formal Agreement with an Authorized Inspection Agency (AIA)

The licensee shall always have in place a formal agreement with an AIA, recognized as such by the CNSC to provide services for the pressure boundaries of the nuclear facility as defined by CSA N285.0 and its applicable referenced publications.

Design registration services for pressure boundaries shall be provided by an AIA legally entitled under the Provincial Boilers and Pressure Vessels Acts and Regulations to register designs. Registration of piping systems shall be done by the Technical Inspection Services Branch, Province of New Brunswick, who is legally entitled to register designs in New Brunswick.

A copy of the signed Agreement shall be provided to the CNSC. During the licence period, the licensee shall notify the CNSC in writing of any change to the terms and conditions of the Agreement, including termination of the Agreement.

The licensee shall arrange for the AIA inspectors to have access to all areas of the facility and records, and to the facilities and records of the licensee pressure boundary contractors and material organizations, as necessary for the purposes of performing inspections and other activities required by the standards. Inspectors of the AIA shall be provided with information, reasonably in advance with notice and time necessary to plan and perform inspections and other activities required by the standards.

For a variance or deviation from the requirements of the CSA N285.0 standard, except as noted below, the licensee must first submit the proposed resolution to the AIA for evaluation, and then to the CNSC for consent. The licensee must demonstrate that meeting the code requirements is impracticable and the proposed resolution will provide adequate safety. Per the agreement with the AIA, the evaluated resolution shall not be implemented without the prior written consent of CNSC staff. A variance or deviation related to Code Edition, Code Classification, and Legacy Registration issues may be submitted directly to the CNSC without prior AIA evaluation. General criteria for obtaining prior written consent/approval for a proposed resolution from the CNSC can be found in LC G.2.

Document #	Document Title	Prior Notification
IR-00911-01	CSA N285.0 Pressure Boundary Program Roadmap	No
IR-00668-01	Pressure Boundary Program <i>This document describes the quality assurance elements of the PLNGS Pressure Boundary Program.)</i>	No
0087-01320-0001-001-OPR-A	Overpressure Protection Report	No
IR-00668-003	ANSI/NBBI NB-23 Repair QA Program for Pressure Relief Valves	No
EPP-30834-RV01	Equipment Program Plan for Overpressure Protection Devices	No

Document #	Document Title	Prior Notification
SI-01365-T107	Requesting Pressure Boundary Classification	Yes
SI-01365-T106	Requesting Pressure Boundary Registration and Reconciliation	No
SCL-01345-3000	System Classification List	No
N/A	Professional Services Agreement with Department of Public Safety Technical Inspection Services Branch	No

Guidance:

The AIA, and its authorized inspectors, should be familiar with and capable of applying the CSA N285.0 provisions to perform the activities as defined by the standard.

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5.3 Equipment and Structure Qualification Program

Licence Condition 5.3:

The licensee shall implement and maintain an equipment and structure qualification program.

Preamble:

Environmental qualification (EQ) ensures all required equipment in a nuclear facility is qualified to perform its safety functions in the event it is exposed to harsh environmental conditions resulting from credited Design Basis Accidents (DBA) and also ensures this capability is preserved for the life of the plant.

Seismic qualification (SQ) ensures all seismically credited safety-related SSCs in a Nuclear Power Plant are designed, installed and maintained to perform their safety function during and/or after (as needed and pre-defined) a design basis earthquake or site design earthquake and also ensures an adequate margin against review level earthquakes.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure equipment and structure qualification as set out in the licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N290.13	Environmental qualification of equipment for nuclear power plants	2018	Implemented
CSA	N289.1	General requirements for seismic, design and qualification of CANDU nuclear power plants		2018 ^a

^aCSA standard N289.1, *General requirements for seismic, design and qualification of CANDU nuclear power plants* was published in 2018. Implementation plan is to be submitted by 2021, December 30. CNSC staff will verify compliance through its oversight activities.

Environmental Qualification

Any design or analysis changes that impact the basis for EQ of the plant, or the qualified equipment would require prior notification of the CNSC.

The licensee main processes that describe environmental qualification (EQ) and seismic qualification (SQ), which are written notification documents listed under the management system in LCH Section 1.1, are:

- PRR-00660-MS-1, *Develop Modifications*;
- PRR-00660-MS-2, *Implement Modifications*; and
- PRR-00660-MS-3, *Maintain Design and Safety Basis*.

Equipment required in a nuclear facility shall be qualified to perform its safety functions during and following a DBA, taking into consideration stressors associated with all service conditions.

Seismic Qualification

Seismically credited safety-related SSCs in a nuclear facility shall be designed, installed, and maintained to perform their intended safety function in the event of an earthquake. Any changes to the seismic qualification that impact the licensing basis would require prior notification of the CNSC.

Document #	Document Title	Prior Notification
EPP-60010-EQ01	Environmental Qualification Program	No
IR-03500-39	Safety Assessment of Plant Operation Following Secondary Side Breaks in the Turbine Building	No
SI-01365-P65	Establishing Equipment Environmental Qualification	No
87-68000 DGS-013 (supplement to DG 68003)	Environmental Qualification of Safety Related Equipment	No
DGA-68000-0003-001	Qualifying Safety Related Electrical and Instrumentation and Control Equipment for Environmental Services Conditions	No
IR-60010-082	EQ Identification of Harsh Environment Areas Outside the Reactor Building	No
SDP-60010-02	Preparing an Environmental Qualification Assessment (EQA)	No
IR-60010-50	Normal Environmental Conditions	No

Guidance:

The processes and procedures related to the EQ program should meet the requirements of recognized industrial standards.

The processes and procedures related to the SQ program should:

- Identify the methods for establishing SQ, including code effective dates;
- Identify the SSCs for which evaluation of their capacity beyond the Design Basis Earthquake has been done;
- Identify the methods used for Beyond Design Basis Earthquake evaluation;
- Include procedural controls to address ageing-related degradation (ageing management) to ensure SQ of existing SSCs for the life of the plant (See also LC 6.1 and the requirements for REGDOC-2.6.3, Aging Management);
- Identify the seismic monitoring system and its design and maintenance requirements; and
- Include procedural controls for establishing SQ for new and replacement items.

Guidance Documents

Source	Document #	Document Title	Version
CSA	N289.2	Ground motion determination for seismic qualification of nuclear power plants	2010 ^a
CSA	N289.3	Design procedures for seismic qualification of nuclear power plants	2010 ^b
CSA	N289.4	Testing procedures for seismic qualification of nuclear power plant structures, systems, and components	2012 (R2019)
CSA	N289.5	Seismic instrumentation requirements for nuclear power plants and nuclear facilities	2012 (R2017)

^aCSA standard N289.2, *Ground motion determination for seismic qualification of nuclear power plants* was published in 2021. Implementation plan to be submitted by 2021, December 30.

^bCSA standard N289.3, *Design procedures for seismic qualification of nuclear power plants* was published in 2020. Implementation plan to be submitted by 2021, December 30.

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6 SCA – FITNESS FOR SERVICE

6.1 Fitness for Service Programs

Licence Condition 6.1:

The licensee shall implement and maintain a fitness for service program.

Preamble:

The fitness for service SCA includes the following SpAs:

- Equipment fitness for service/equipment performance (Reliability);
- Maintenance;
- Structural integrity (Addressed in other SpAs);
- Ageing management;
- Chemistry control; and
- Periodic inspection and testing.

In addition, fitness for service SCA includes the requirements of CNSC regulatory document REGDOC-2.3.3: *Periodic Safety Reviews*.

Compliance Verification Criteria:

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 2.6.1	Reliability Programs for Nuclear Power Plants	2017	Implemented
CNSC	REGDOC 2.6.2	Maintenance Programs for Nuclear Power Plants	2017	Implemented
CNSC	REGDOC 2.6.3	Aging Management	2014	Implemented
CSA	N290.13	Environmental qualification of equipment for nuclear power plants	2018	Implemented
CSA	N285.4 – PIP GPB and Feeders	Periodic inspection of CANDU nuclear power plant components	2014 ^a	Implemented
CSA	N285.4 – Fuel Channels	Periodic inspection of CANDU nuclear power plant components	2014 ^a	Implemented

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N285.4 – Steam Generator Tubes	Periodic inspection of CANDU nuclear power plant components	2009 ^b	Implemented
CSA	N285.5	Periodic inspection of CANDU nuclear power plant containment components	2010 ^c (Update 1)	Implemented
CSA	N287.7	In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plant components	2017	Implemented
CSA	N285.8	Technical requirements for in-service inspection evaluation of zirconium alloy pressure tubes in CANDU reactors	2010 ^d (Update 2)	Implemented
COG	07-4089	Fitness-for-Service Guidelines for Steam Generator and Preheater Tubes	2016	Implemented

^aCSA N285.4 - PIP GPB and Feeders and CSA N285.4 – Fuel Channels, version 2019, Periodic inspection of CANDU nuclear power plant components, NB Power to be compliant by 2022 June 30.

^bCSA N285.4 – Steam Generator Tubes, version 2014, Periodic inspection of CANDU nuclear power plant components, NB Power to be compliant by 2022 June 30.

^cCSA N285.5, version 2018, Periodic inspection of CANDU nuclear power plant containment components, NB Power to be compliant by 2022 June 30.

^dCSA N285.8, version 2015, Technical requirements for in-service inspection evaluation of zirconium alloy pressure tubes in CANDU reactors NB Power to be compliant by 2022 June 01.

Equipment Fitness for Service/Equipment Performance (Reliability)

The equipment fitness for service/equipment performance relates to the reliability of the facility’s SSCs. The licensee shall implement and maintain a reliability program in accordance with CNSC Regulatory Document REGDOC 2.6.1 *Reliability Programs for Nuclear Power Plants*. The requirements help to assure that the systems important to safety (SIS) can meet their defined design, and performance criteria throughout the lifetime of the facility.

The equipment fitness for service/equipment performance SpA includes the following review topics and requirements from CSA N286-12 (clauses identified below) and REGDOC 2.6.1:

- Reliability Program (N286-12 Clauses 7.9.5, 7.9.5(a)-(d)):
 - Systems Important to Safety (SIS);
 - Reliability of SIS;
 - Reliability Targets; and
 - Reliability Assessments.

Reliability Program

The licensee shall establish a reliability program in accordance with REGDOC-2.6.1 that includes setting reliability targets, performing reliability assessments, testing and monitoring, and reporting for plant systems whose failure affect the risk of a release of radioactive or hazardous material.

CNSC regulatory document REGDOC-2.6.1, *Reliability Programs for Nuclear Power Plants* outlines the requirements for a reliability program. This document has replaced RD/GD-98 in the regulatory framework. Given that REGDOC-2.6.1 has no material changes from RD/GD-98, for compliance purposes where RD/GD-98 is referenced in NB Power governing documents, it shall be taken to mean REGDOC-2.6.1. NB Power will update the references to RD/GD-98 in their governance in accordance with their regular document review cycle.

The licensee main core process which describes the reliability program is PRR-00660-ME-2, *Monitor and Manage System Health*, a written notification document also listed under the management system in LCH Section 1.1. The licensee reliability program is defined in IR-01500-12, *Reliability Program*.

Systems Important to Safety and Reliability Targets

All changes or modifications, temporary or permanent, to systems important to safety (SIS) shall be identified in the annual reliability report. CNSC staff will review the annual report on risk and reliability submitted in accordance with REGDOC 3.1.1 to confirm the performance of systems important to safety meet the reliability requirements. See LCH Section 3.3 for version control of REGDOC 3.1.1.

Maintenance Program

The licensee shall implement and maintain a maintenance program. This program shall be in accordance with CNSC Regulatory Document REGDOC 2.6.2, *Maintenance Programs for Nuclear Power Plants*. A nuclear power plant maintenance program consists of policies, processes and procedures that provide direction for maintaining the structures, systems, and components (SSCs) of the plant. The intent of a maintenance program is to ensure that the SSCs remain capable of maintaining their function as described in the safety analysis. A maintenance program uses organized activities, both administrative and technical, to keep SSCs in good operating condition, and to ensure that they function as per design.

The licensee main core processes that describe the maintenance program, which are written notification documents listed under the management system in LCH section 1.1, are:

- PRR-00660-ME-1, *Establish Maintenance Programs*, and
- PRR-00660-MA-3, *Perform Maintenance*.

Outage Management Programs

The licensee maintenance program shall include provisions for the management of planned outages. Planned outages represent a key activity that has a high regulatory significance. Therefore the licensee is expected to ensure proper scoping of safety-related commitments, planning and execution (e.g., for heat sinks, dose control, etc.). Specific requirements related to heat sinks and dose control can be found in LCH Sections 3 and 7.

Ageing Management

Ageing Management

REGDOC 2.6.3 *Ageing Management* sets out the requirements of the CNSC for managing the ageing of structures, systems and components (SSCs) of a power reactor facility. The NB Power ageing management program is described in IR-05000-06, *Integrated Ageing Management Program*, which is the overarching document for the ageing program.

The ageing management SpA includes the following review topics and requirements:

- Integrated Aging Management (REGDOC-2.6.3):
 - Lifecycle Management:
 - Major pressure boundary components (fuel channels, feeders and steam generators) and reactor components and structures;
 - Concrete Containment Structures; and
 - Periodic Inspection (See SpA for Periodic Inspection).

Ageing management is comprised of activities (engineering, operational, inspection, and maintenance actions) implemented proactively to ensure the reliability and availability of required safety functions of SSCs throughout the life of a nuclear power plant. Consistent with the intent of the *Class I Nuclear Facilities Regulations*, licensees are expected to establish, implement, and improve programs for managing ageing, including obsolescence, of SSCs to ensure that required safety functions are maintained.

Managing the ageing effects of a reactor facility is necessary to ensure the availability of required safety functions throughout the facility's service life, with consideration given to changes that occur over time and with use. This requires addressing both physical ageing and obsolescence of SSCs that can, directly or indirectly, have an adverse effect on the safe operation of the reactor facility.

The Licence Application Documents that Require Notification of Change table found in this licence condition includes a list of SSC-specific ageing management programs (or LCMPs) that shall be submitted to CNSC for review as written notification documents.

In practice, effective ageing management requires the involvement and support of many essential programs and processes, for example:

- Deterministic and probabilistic safety analysis (LCH Section 4);
- Periodic Safety Review (LCH Section 6.2) and Integrated Implementation Plan (LCH Section 6.3)
- Design, engineering change control (LCH Section 5);
- Periodic and in-service inspection programs (LCH Section 6 under Periodic and In-Service Inspection);
- Equipment reliability (LCH Section 6 under Reliability);
- Maintenance programs (LCH Section 6 under Maintenance);
- Environmental and seismic qualification programs (LCH Section 5.3);
- System health monitoring programs (LCH Section 6 under Ageing);
- Operating procedures (LCH Section 3), chemistry programs (LCH Section 6 under Chemistry Control);
- Operating experience, significant events analysis and research programs (LCH Section 3); and

- Fire protection programs (LCH Section 10.2 and 16).

NB Power already has a number of existing ageing management plans for SSCs, which are contained in equipment program plans. NB Power shall comply with the requirements of REGDOC 2.6.3 for any newly issued or revised equipment program plans.

The SSC-specific Ageing Management plans or equipment program plans are submitted with, or in support of, the application as licensing basis documents. As such, any changes to these Ageing Management plans or equipment program plans shall be submitted to CNSC staff to ensure compliance with the licensing basis and provide adequate justification for changes to prior licensee commitments related to the continued operation of the facility. When considering possible changes to activities identified in the Ageing Management plans or equipment program plans, the licensee shall engage CNSC staff early and provide confirmation the changes are within the licensing basis prior to implementing the change. Administrative or other such changes to the documents are subject to normal notification requirements as indicated in the written notification documents table for this section.

When Periodic Inspection Programs (PIPs) are combined with equipment program plans for major pressure boundary systems or components such as fuel channels, feeders and steam generators, the compliance criteria established for Periodic Inspection and Testing, described later, shall be met.

In addition, the ageing management plans are also subject to the integrated implementation plan actions, which are detail under LCH section 6.3.

System Health

The licensee's main core process that describes the system health monitoring program, which is a written notification documents list under the management system in LCH section 1.1, is PRR-00660-ME-2, *Monitor and Management System Health*.

The licensee system health monitoring program is SI-01365-T54, *System Health Monitoring*.

Clause 7.9.10 of CSA N286-12 describes the requirements needed to address system health monitoring.

Chemistry Control

The licensee's chemistry control SpA includes the following review topics and requirements from CSA N286-12 (Clauses 7.9.11, 7.9.11 (a) – (c))

- Chemistry Control Program
 - Preserve the integrity of SSCs important to safety;
 - Manage the harmful effects of chemical impurities and corrosion on plant SSCs; and
 - Implement the ALARA principle to manage the buildup of radioactive material and occupational radiation exposure.
 - Limit the release of chemicals and radioactive materials to the environment.
- Chemical Surveillance (effectiveness of chemistry control in plant systems):
 - Chemical parameters;
 - Operational specifications;
 - Parameter monitoring, measurement and sampling including post-accident sampling; and
 - Trending.
- Chemistry Specifications for systems, and

- Storage and Handling.

The licensee shall implement and maintain a chemistry control program. The chemistry control program shall specify processes, specifications, overall requirements, parameter monitoring, data trending and evaluation to ensure effective control of plant chemistry during operational and lay-up conditions. The licensee shall also maintain a set of technical basis documents describing the design basis for chemistry control and monitoring.

The licensee main core processes that describe the chemistry control program is PRR-00660-OP-2, *Control Chemistry*, which is included in the written notification documents list under the management system in LCH section 1.1. The licensee chemistry control program is described in SI-01365-P94, *Controlling Station Chemistry*.

Periodic Inspection and Testing

The periodic inspection and testing SpA includes the following review topics and requirements:

- Periodic Inspection/In-Service Inspection:
 - General Pressure Boundaries (CSA N285.4);
 - Fuel Channels (CSA N285.4);
 - Feeders (CSA N285.4);
 - Steam Generators (CSA N285.4);
 - Containment Components (CSA N285.5);
 - Concrete Containment Structures (CSA N287 Series);
 - Safety-related Structures (CSA N291); and
 - Balance of Plant Systems and Components.

The licensee shall carry out periodic inspections in accordance with the accepted PIP documents. The currently accepted PIP documents are listed in the written notification documents table of this section.

The licensee shall prepare, update and revise, as necessary, periodic inspection program (PIP) documents in accordance with the requirements of the CSA Standards listed in the licence condition.

The licensee main core processes that describe periodic inspection and testing are included in the following core processes, which are written notification documents listed under the management system in LCH Section 1.1:

- PRR-00660-ME-1, *Establish Maintenance Programs* and
- PRR-00660-ME-2, *Monitor and Manage System Health*.

Within the context of the operating licence, the purpose of a periodic inspection program (PIP) or an in-service inspection (ISI) program is to provide assurance that the likelihood of a failure that could endanger the environment and/or radiological health and safety of persons has not increased significantly since the plant was put into service.

Inspection program documents and revisions prepared in accordance with CSA standards N285.4, N285.5 and N287.7-08 require CNSC staff acceptance prior to implementation by the licensee. Specifically, elements of new program documents or any modifications or revisions to previously accepted program documents that impact the scope of work required by the governing CSA PIP Standards shall require the

acceptance of CNSC staff 30 days prior to implementation. Administrative or other such changes to the document are subject to written notification requirements. When PIP requirements are addressed exclusively within an Ageing Management Plan, only those elements of the documented plan that directly address the PIP requirements of the governing CSA standard require acceptance from CNSC staff prior to implementation. The non-PIP elements of combined documents are subject to standard written notification requirements as set out in the LCH Section G.1 and G.2.

If a deviation from the accepted PIP is anticipated during inspection planning activities, the licensee shall obtain CNSC acceptance prior to conducting the affected inspections. However, for any findings, discoveries or deviations from the accepted PIP that are identified during an inspection, the licensee shall follow organizational governance to provide justification to the CNSC in the inspection report submission, based on OPEX and best industry practices. For permanently required exemptions to the requirements of PIP standards, the licensee shall revise the affected PIP document accordingly prior to issuing the next scheduled revision of the PIP document.

In the event that program modifications are required, and insufficient time is available to update the program documents according to the schedule discussed in the preceding paragraph, the licensee may obtain acceptance of a program modification using official correspondence with a commitment to update the program documents by a date mutually agreeable to the licensee and CNSC staff. Obtaining CNSC staff acceptance of temporary deviations to a program shall be addressed through official correspondence and may not require revision of the PIP documents.

Personnel conducting non-destructive examinations shall be certified in accordance with the edition of CAN/CGSB 48.9712/ISO 9712 currently adopted for use by the National Certification Body (NCB) of Natural Resources Canada for the appropriate examination method. If the NCB does not offer certification for a specific inspection method, the relevant alternate requirements of Clause 5 of CSA N285.4 or Clause 6 of N285.5, as applicable, shall apply, to ensure that personnel are appropriately trained and qualified.

Compliance verification criteria relevant to specific PIP programs are discussed in the sections, below.

General Pressure Boundaries – CSA N285.4 Clause 3-11

Inspections shall be carried out in accordance with the equipment program plan accepted by CNSC staff on August 7, 2012 (e-Doc 3982122).

Fuel Channel Pressure Tubes – CSA N285.4 Clause 12 and CSA N285.8

The Fuel Channels PIP has been accepted by CNSC e-Doc 5743864 – January 8, 2019. Additionally, CNSC staff will be monitoring the NB Power measures for assuring data compatibility between technical service providers.

CNSC has requested NB Power to augment the next volumetric and dimensional inspection (planned for 2024) by at least two additional fuel channels. NB Power concurred with the request (e-Doc 6487657).

Documentation of procedures and methods specific to inspections in compliance with CSA N285.4, Clause 12 shall be submitted to the CNSC for acceptance prior to each applicable maintenance outage as follows:

- A Minimum of 30 days prior to the inspection or surveillance activity for CNSC review and acceptance when procedures and tooling have been employed in a prior inspection at PLNGS, or
- A minimum of 60 days prior to the inspection or surveillance activity to permit appropriate review for acceptance when procedures and tooling have not been used for a prior inspection.

With respect to Clause 12.3.2 of CSA N285.4, the extent of measurement and sample size of hydrogen equivalent concentration determination, for rolled joint measurements, future submissions of calculated rolled joint hydrogen equivalent concentration profiles will not be considered acceptable by CNSC staff (CNSC correspondence e-Doc 5945514).

Where N285.4 and/or the licensee PIP documents refer to N285.8, NB Power is expected to comply with N285.8-10 Update 2, which has been accepted for use by CNSC on September 30, 2016 (e-Doc 5080830).

With respect to CSA N285.8-15 Clause 5.4.3.1 (g), regarding the evaluation of the initiation of delayed hydride cracking of detected flaws during Service Level B transients, due to fracture of hydrided region, CNSC has accepted NBP's plan (#5965006) with letter #6065510.

As referenced in licensee document 0087-01322-3008-001-SR-A-00, "Point Lepreau Nuclear Generating Station Safety Report 2016", LCH Section 4.1, the fuel channels, specifically the pressure tubes, were designed for an estimated life of 210,000 equivalent full power hours (EFPH) of operation. This is part of the design basis, which, in turn, is part of the licensing basis. For operation with pressure tubes that have exceeded 210,000 EFPH, the licensee shall provide an assessment to demonstrate continued fitness for service of the pressure tubes. Operation of any unit with pressure tubes which service extends beyond 210,000 EFPH is not permitted unless approved by the Commission in accordance with LC 1.1.

Fuel Channel Feeder Pipes – CSA N285.4 Clause 13

Inspections shall be carried out in accordance with the equipment program plan accepted by CNSC staff on August 7, 2012 (e-Doc 3982122).

Steam Generator Tubes and Internals – CSA N285.4 Clause 14

Inspections shall be carried out in accordance with the equipment program plan accepted by CNSC staff on February 6, 2020 (e-Doc 6110963). With respect to CSA N285.4-09 (2014 edition) clause 14.2.5.1.3, CNSC staff has accepted (e-Doc 4178331) COG-07-4089 "Fitness-for-Service Guidelines for Steam Generator and Preheater Tubes, Section I: Evaluation Procedures and Acceptance Criteria" (e-Doc 3401312).

Containment Components – CSA N285.5

Inspections shall be carried out in accordance with the equipment program plan accepted by CNSC staff on December 18, 2013 (e-Doc 4256478).

Concrete Containment Structures – CSA N287.7

The Reactor Building Management, Plan Equipment Program Plan and the Standard Leak-Rate Test for CANDU 600 Containment Building Technical Specification were accepted by CNSC staff on February 7, 2014 (e-Doc 4325265).

The licensee shall carry out inspections and leakage rate tests for the Reactor Building in accordance with the requirements of CSA N287.7-08 at a frequency acceptable to CNSC staff. The currently accepted inspection and leakage rate test frequency for the Reactor Building is every four years (e-Doc 5495107).

Balance of Plant – CSA N285.7

Until full implementation of a CSA N285.7 program is achieved, NB Power is expected to continue with existing inspection programs for the balance of plant pressure boundary systems and report findings in accordance with REGDOC-3.1.1.

Document #	Document Title	Prior Notification
Reliability		
IR-01500-12	Reliability Program	No
SI-01365-T23	Mandatory Surveillance Program	No
IR-01500-14	Basis for List of Systems Important to Safety	No
IR-01500-16	PSA Insight into Systems Important to Safety and Identification of Risk Related to Structures, Systems and Components	No
Maintenance		
SI-01365-T089	Continuing Equipment Reliability Improvement	No
SI-01365-P74	Managing Planned Outages	No
Ageing Management		
IR-05000-06	Integrated Aging Management Program	No
EPP-57000-01	Cable Preservation Program (CPP)	No
EPP-67140-FTT1	Fire System Management Plan	No
EPP-67140-FTT2	Fire Equipment Management Plan	No
EPP-78600-EME1	Emergency Mitigation Equipment	No
EPP-78600-ERT1	ERT Equipment Program Plan	No
SI-01365-T54	System Performance Monitoring	No
Chemistry Control		
SI-01365-P94	Controlling Station Chemistry	No
Periodic and In-Service Inspection		
General Pressure Boundaries - CSA N285.4 Clauses 3-11		
EPP-03641-PIP1	Equipment Program Plan for Periodic Inspection Program (PIP) CSA N285.4	Yes
Fuel Channel Pressure Tubes - CSA N285.4 Clause 12 and CSA N285.8		
EPP-31100-FC01	Fuel Channel Management Plan	Yes

Document #	Document Title	Prior Notification
IR-31110-0001-001-A	Compliance Plan for Long-Term Use of CSA N285.8-10 for In-Service Evaluation of Zirconium Alloy Pressure Tubes ^a	Yes
Fuel Channel Feeder Pipes – CSA N285.4 Clause 13		
EPP-03641-PIP1 (Appendix C)	Fuel Channel Feeder Pipes Periodic Inspection Program	Yes
Steam Generator Tubes and Internals – CSA N285.4 Clause 14		
EPP-33110-SG01	Steam Generator Management Plan	Yes
Containment Components - CSA N285.5		
EPP-03642-PIP2	Equipment Program Plan for Periodic Inspection Program (PIP) CSA N285.5	Yes
Concrete Containment Structures - CSA N287.7		
EPP-21000-RB01	Reactor Building Management Plan	Yes
0087-21080-3001-001-TS-A	Standard Leak-Rate Test for CANDU 600 Containment Building	Yes
Balance of Plant – CSA N285.7		
EPP-03646-FC01	Equipment Program Plan for Flow-Accelerated Corrosion	No
EPP-30834-RV01	Equipment Program Plan for Overpressure Protection Devices	No
EPP-30839-PV01	Equipment Program Plan for Air Operated Valves	No
EPP-30839-MV01	Equipment Program Plan for Motor Operated Valves	No
EPP-03644-PV01	Equipment Program Plan for Pressure Vessels	No
EPP-03643-ISI1	Enhanced Inspection of Secondary Side Pipework for Protection of the Main Control and Secondary Control Area	No
EPP-03640-BP01	Buried Piping Integrity Program	No

Guidance:

Maintenance

The scope of the maintenance program covers all SSCs within the bounds of the nuclear power plant, which includes activities for monitoring, inspecting, testing, assessing, calibrating, servicing, overhauling, repairing, and parts replacing. The type of maintenance activity and frequency applied to each SSC should be commensurate with importance to safety, design function and required performance.

Outage Management Programs

The outage program should have designated criteria the licensee will follow to confirm planned and discovery work has been satisfactorily completed during the planned outage, and all safety-significant SSCs are available to ensure the continued safe operation of the facility.

Outage completion assurance statement should include the status of planned work identified in the notification of regulatory undertakings but not completed.

CNSC staff located at the site offices should be invited to the restart meetings in order to verify that all appropriate reviews for a restart of the reactor have occurred.

Ageing Management

Whenever a revision to the AMP, SSC-specific AMP or equipment program plan is submitted to CNSC for review, the licensee should identify whether the revision(s), affects the previously planned inspection and maintenance activities, with a supporting technical basis for the change.

The licensee should maintain a roadmap outlining the programs and procedures that ensure a well-documented overall integrated ageing management framework exists.

Periodic Inspection and Testing

For major pressure boundary systems or components, including the primary heat transport system piping, fuel channels, feeders and steam generators, the licensee should prepare and update, in accordance with the change control process, component specific ageing management plans. Accepted changes to the PIP should be reflected in the LCMPs, where applicable.

NB Power should review the compliance matrices for periodic inspection programs on an annual basis to confirm the programs reflect current practices.

Guidance Documents

Guidance Publications			
Source	Document #	Document Title	Version
Ageing Management			
CSA	N287.8	Aging Management for concrete containment structures for nuclear power plants	2015 (R2020)
Periodic Inspection and Testing			
CSA	N287.1	General requirements for concrete containment structures for nuclear power plants	2014 (R2019)
CSA	N287.2	Material requirements for concrete containment structures for CANDU nuclear power plants	2008 ^a
CSA	N287.6	Pre-operational proof and leakage rate testing requirements for concrete containment structures for nuclear power plants	2011 ^b

^aCSA standard N287.2, *Material requirements for concrete containment structures for CANDU nuclear power plants* was published in 2017. NB Power to implement this by 2023, March 31. CNSC staff will verify compliance through its oversight activities.

^bCSA standard N287.6, Pre-operational proof and leakage rate testing requirements for concrete containment structures for nuclear power plants was revised in 2021. NB Power to provide the implementation date.

DRAFT

7 SCA – RADIATION PROTECTION

7.1 Radiation Protection Program and Action Levels

Licence Condition 7.1:

The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

Preamble

The [Radiation Protection Regulations](#) require that the licensee implement a radiation protection program and also ascertain and record doses for each person who perform any duties in connection with any activity that is authorized by the [Nuclear Safety and Control Act](#) or is present at a place where that activity is carried on (applicable to both the nuclear and waste storage facilities). This program must ensure that doses to persons (including workers) do not exceed prescribed dose limits and are kept As Low As Reasonably Achievable (the ALARA principle), social and economic factors being taken into account.

Regulatory dose limits to workers and the general public are explicitly provided in sections 13, 14 and 15 of the [Radiation Protection Regulations](#).

Specific regulatory requirements related to the implementation of all aspects of a radiation protection program, including action levels, are found in the *Radiation Protection Regulations, Class I Nuclear Facilities Regulations, General Nuclear Safety and Control Regulations, Nuclear Substances Radiation Devices Regulations*, REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants* (LC 3.3), and CSA N286-12, *Management Systems Requirements for Nuclear Power Plants* (LC 1.1.). For this licence, the compliance verification criteria are identified in these requirements as well as in the compliance verification criteria below.

In accordance with the CNSC regulatory framework, the Safety and Control Area “Radiation Protection” covers the implementation of a radiation protection program as required by the Radiation Protection Regulations.

The radiation protection SCA includes the following SpAs:

- Application of ALARA;
- Worker dose control;
- Radiation protection program performance; and
- Radiological hazard control

The development of the action levels referred to in the LC is captured in the radiation protection program performance SpA.

Compliance Verification Criteria:

Application of ALARA

The purpose of this specific area is to verify efforts towards maintaining radiation doses ALARA, social and economic factors taken into account. Review topics captured in this specific area include:

- ALARA in the design of facilities, processes, structures, systems and components;
- ALARA optimization process;
- ALARA program; and
- Work Plans and Approvals.

Worker Dose Control

The purpose of this specific area is to verify the control of occupational exposures to radiation and to report on radiation doses received by workers. Review topics captured in this specific area include:

- Area postings, and policies and procedures;
- Bioassays (in vivo and in vitro);
- Nuclear Energy Worker (NEW) policy and procedures;
- Planning for unusual situations;
- Radiation dose devices;
- Radiation dose targets and tracking/trending;
- Radiation exposures and radiation dose assessments;
- Radiation work planning;
- Reporting and performance trending of worker doses; and
- Selection, use (donning and doffing), and maintenance of radiation personal protective equipment (PPE).

Radiation Protection Program Performance

The licensee main support process which describes the radiation protection program is PRR-00660-SU-4, *Provide Personnel Safety Services*, a written notification document listed under the management system in LCH Section 1.1.

The purpose of this specific area is to verify the effectiveness of the radiation protection program in protecting the health and safety of persons, including performance against objectives, goals and targets, and continuous improvement initiatives. Review topics captured in the specific area include:

- Content for radiation protection (RP) training and qualification of management, workers, and all other persons (i.e. visitors, contractors);
- Effectiveness reviews of the RP program;
- Management RP oversight;
- Quality management of RP procedures and practices;
- Organization and administration of the RP program;
- The establishment and implementation of RP Action and Administrative Levels (described in more detail, below);
- RP program performance objectives, monitoring and tracking/trending; and

- Self-assessment process/audits and corrective action feedback of the RP program.

Radiological hazard control:

- Classification of areas and zoning, including area posting, policies and procedures
- Radiation monitoring equipment and instrumentation
- Radiological hazard characterization and assessment
- Radiological hazard non-conformances with RP program requirements
- Radiological hazard surveys and control programs
- Labelling of containers and devices

Radiation Protection Action Levels

Action Levels (ALs) are designed to alert licensees before regulatory dose limits are reached. By definition, if an action level referred to in a licence is reached, a loss of control in some part of the associated radiation protection program may have occurred, and specific action is required, as defined in the [Radiation Protection Regulations](#) and the licence. Dose performance history should be considered when establishing/reviewing ALs. ALs should be reviewed on a routine basis to ensure that they remain appropriate.

Section 6 of the [Radiation Protection Regulations](#) specifies the requirements related to ALs and indicates the licence will be used to identify ALs and the notification timeframes. Licence Condition 7.1 specifies the Commission will be notified within 7 days of becoming aware that an AL has been reached.

The ALs are considered part of the licensing basis. Changes to these limits are subject to LCH Section G.1. The current ALs are extracted from EXP-03400-0001 *Radiation Protection Expectations and Directives*, a document requiring prior notification and are summarized in the table below. In the event of a discrepancy between these tables below and the licensee documentation upon which they are based, the licensee documentation shall be considered the authoritative source (assuming that the licensee has followed their own change control process).

Action Levels: Worker Dose

Field of application	Value	Action Level
<u>DOSE TO WORKERS:</u> A worker receives an unplanned radiation exposure.	2 mSv	<p>A worker receives an unplanned gamma dose of ≥ 2.00 mSv or an unplanned internal committed dose from tritium or an unplanned committed dose from other nuclides of ≥ 2.00 mSv.</p> <p><u>For unplanned exposures due to gamma radiation:</u> The ≥ 2 mSv value applies to the level of exposure above the allowable gamma dose specified in a radiation exposure permit (REP). For instances in which a REP was not issued, the ≥ 2 mSv value applies.</p> <p><u>For unplanned exposure due to tritium:</u> The ≥ 2 mSv value applies to the assigned committed effective dose (CED) level above the allowable tritium dose specified in a REP. For instances in which a REP was not issued, the ≥ 2 mSv value applies.</p> <p><u>For unplanned exposure due to internal exposures of nuclear substances other than tritium:</u> The ≥ 2 mSv value applies to the CED level received due to periods of uptake that have occurred during (but not exceeding) a 1-year dosimetry period.</p>
<u>DOSE TO WORKERS:</u> Cumulative annual Individual radiation dose exceeds annual administrative dose limits.	The Administrative Dose Limits (ADLs) are shown in the Table below.	A worker exceeds an ADL.

Administrative Dose Limits for Nuclear Energy Workers: taken from NB Power document EXP-03400-0004 *Radiation Protection Expectations and Directives*.

Effective and equivalent doses	Administrative Dose Limit
Effective dose	20 mSv/year*
	80 mSv in a five-year dosimetry period
	3 mSv for the remainder of the pregnancy (from the time of declaration)
Equivalent dose (Lens of the Eye)	30 mSv /year
Equivalent dose (Skin / Extremities) ^b	200 mSv/year ^a

^aThe ADL for specialized voluntary workers may be up to 30 mSv whole body and 300 mSv skin and extremity. These ADL assignments shall be limited to specialized voluntary workers. The 5 year dosimetry period ADL will be maintained at all times.

^bFor skin contamination events, the action level shall be applied to the calculated exposure based on the highest level of activity measured over an area of not more than 1 cm².

Administrative Dose Limit for non-Nuclear Energy Workers: taken from NB Power document EXP-03400-0001, *Radiation Protection Expectations and Directives*.

Whole Body	Administrative Dose Limit
Whole Body	0.1 mSv/year

Action Levels: Surface Contamination Levels

Field of application	Action Level	Observations
<u>CONTAMINATION CONTROL:</u> Alpha or Beta-gamma surface contamination levels beyond limits in Zone 1 or off-site.	370 Bq/100 cm ² of beta-gamma; 37 Bq/100 cm ² of alpha	Total (fixed and loose) surface contamination levels greater than 370 Bq/100 cm ² (beta-gamma) or 37 Bq/100 cm ² of alpha are found in Zone 1 or off-site. <u>Notes:</u> 1. Transfer of items above these levels is permitted with approval from the Senior Health Physicist and for radioactive shipments to a facility licenced to possess the quantity of radioactive material being sent. 2. If contamination is detected, the Action Level applies to the highest level measured over an area of not more than 100 cm ² .

Document #	Document Title	Prior Notification
EXP-03400-0001	Radiation Protection Expectations and Directives	Yes
SDP-01368-A046	Controlling Radiation Exposures As Low As Reasonably Achievable (ALARA)	No
IR-03400-02	Respiratory Protection Program	No
IR-03541-06	Technical Basis for Management of Alpha Hazards at PLGS	No
HP-03541-H100	How to Approve a Radiation Work Approval	No
HP-03541-H101	Considerations for Pregnant and Breastfeeding NEWs	No
RPP-03400-0009	Dosimetry	No

Document #	Document Title	Prior Notification
SDP-01368-A042	Planning Radiation Work	No
SDP-01368-A051	Establishing Exposure Limits	No
IR-03400-0004	ALARA Five Year Plan	No
IR-03541-0013	Technical Basis for Ascertaining and Assigning Lens of Eye Dose at PLNGS	No

Guidance:

The licensee should conduct a documented review and, if necessary, revise the ALs specified above at least once every five years in order to validate their effectiveness. The results of such reviews should be provided to CNSC staff.

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC-2.7.1	Radiation Protection	2021
CNSC	REGDOC-2.7.2 Volume 1	Dosimetry: Ascertaining Occupational Dose	2021

8 SCA – CONVENTIONAL HEALTH AND SAFETY

8.1 Conventional Health and Safety Program

Licence Condition 8.1:

The licensee shall implement and maintain a conventional health and safety program.

Preamble:

Workers at the Point Lepreau nuclear facility are excluded from the application of Part 2 “Occupational Health and Safety” (sections 158 to 160 excluded) of the *Canada Labour Code* under the consolidated statute SOR/2008-76 published by the Minister of Justice current to July 27, 2011.

The licensee occupational health and safety program is to comply with the *New Brunswick Occupational Health and Safety Act* and any associated provincial statutes to minimize risk to health and safety of workers posed by conventional (non-radiological) hazards in the workplace.

The conventional health and safety SCA includes the following SpAs:

- Performance;
- Practices; and
- Awareness.

Compliance Verification Criteria:

Conventional Health and Safety Program (Performance, Practices and Awareness)

The licensee main support process which describes the occupational health and safety program is PRR-00660-SU-4, *Provide Personnel Safety Services*, which is a written notification document listed under the management system in LCH Section 1.1.

WorkSafe NB is mandated with overseeing the implementation and application of the *New Brunswick Occupational Health and Safety Act* and associated provincial statutes.

Inside the protected area, the licensee documents shall be in accordance with the appropriate sections of CSA N293. See LCH Section 10.2 for version control of CSA N293.

In the waste handling and storage facilities located outside of the protected area, the licensee documents shall be in accordance with the appropriate sections of CSA N393. See LCH Section 15.3 for version control of CSA N393.

The licensee has the prime responsibility for safety at all times. This responsibility cannot be delegated or contracted to another organization or entity. The licensee shall ensure contractors and other organizations present on site are informed of and uphold their roles and responsibilities related to conventional health and safety.

Document #	Document Title	Prior Notification
SI-01365-A040	Maintaining the Joint Health and Safety Committee	No

Guidance:

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC 2.8.1	Conventional Health and Safety	2019

DRAFT

9 SCA – ENVIRONMENTAL PROTECTION

9.1 Environmental Protection Program

Licence Condition 9.1:

The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

Preamble:

Licensees set Environmental Action Levels (EALs) and related parameters, so as to provide early warnings of any actual or potential losses of control of the Environmental Protection Program. EALs are precautionary levels and are set far below the actual Derived Release Limits (DRLs). EALs are designed to alert licensees before DRLs are reached. They are specific doses of radiation or other parameter that, if reached, may indicate a loss of control of the licensee's Environmental Protection Program.

The release of hazardous substances is regulated by the Province of New Brunswick and Environment Canada and Climate Change (ECCC) through various acts and regulations, as well as the CNSC.

CNSC regulatory document, REGDOC-2.9.1, version 1.2. *Environmental Protection: Policies, Programs and Procedures*, describes the CNSC's principles for environmental protection for all nuclear facilities or activities that interact with the environment, the scope of an environmental review and the roles and responsibilities associated with an environmental review, as well as the CNSC's requirements and guidance to applicants and licensees for developing environmental protection measures, including an environmental risk assessment (ERA) where required for both new and existing facilities or activities.

The environmental protection SCA includes the following SpAs:

- Assessment and monitoring;
- Effluent and emissions control (releases);
- Environmental management system (EMS);
- Estimated dose to the public
- Protection of people; and
- Environmental Risk Assessment.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure environmental protection as set out in licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Effective Date
CNSC	REGDOC 2.9.1	Environmental Protection: Environmental Principles, Assessments and Protection Measures	2017 ^a	Implemented
CSA	N288.1	Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities	2014 ^b	Implemented
CSA	N288.4	Environmental monitoring program at Class I nuclear facilities and uranium mines and mills	2010 ^c	Implemented
CSA	N288.5	Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills	2011	Implemented
CSA	N288.6	Environmental risk assessment at Class I nuclear facilities and uranium mines and mills	2012	Implemented
CSA	N288.7	Groundwater protection programs at Class I nuclear facilities and uranium mines and mills	2015 ^d	Implemented

^aCNSC REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* version 2020: NB Power to provide gap analysis and implementation plan. NB Power to implement this version by 2025, December 15.

^bCSA N288.1, *Guidelines for modelling radionuclide environmental transport, fate, and exposure associated with the normal operation of nuclear facilities* was revised 2020, January 1. NB Power to implement this version.

^cCSA N288.4, *Environmental monitoring program at Class I nuclear facilities and uranium mines and mills* version 2019: NB Power to implement this version by 2025, January 30.

^dCSA N288.7, *Groundwater protection programs at Class I nuclear facilities and uranium mines and mills* version 2020: NB Power to implement this version.

Assessment and Monitoring

CSA standard [N288.4](#), ENVIRONMENTAL MONITORING PROGRAMS AT CLASS I NUCLEAR FACILITIES AND URANIUM MINES AND MILLS outlines the requirements for an environmental monitoring program. This document was revised in May 2010 to include radioactive and hazardous substances, physical stressors, potential biological effects, and pathways for both human and non-human biota.

An Environmental Monitoring Program (EMP) consists of a risk-informed set of integrated and documented activities to sample, measure, analyze, interpret, and report the following:

- the concentration of hazardous and/or nuclear substances in environmental media to assess one or both of
 - exposure of receptors to those substances; and
 - the potential effects on human health, safety, and the environment;
- the intensity of physical stressors and/or their potential effect on human health and the environment; and
- the physical, chemical, and biological parameters of the environment normally considered in the design of the EMP.

NB Power main process which describes the environmental protection program is SI-01365-P101, *Developing and Maintaining the Environmental Management System*.

Effluent and Emissions Control (Releases)

The licensee shall ensure effluent monitoring for nuclear and hazardous substances is designed, implemented and managed to respect applicable laws and to incorporate best practices. The effluent monitoring program shall provide for the control of airborne and waterborne effluents. Effluent monitoring is a risk-informed activity which assures quantifying of the important releases of the nuclear and hazardous substances into the environment.

CSA standard N288.5, EFFLUENT MONITORING PROGRAMS AT CLASS I NUCLEAR FACILITIES AND URANIUM MINES AND MILLS outlines the requirements for an effluent monitoring program. NB Power's Effluent Monitoring Program shall ensure compliance with CSA N288.5.

The licensee main core processes that describe environmental releases, which are written notification documents listed under the management system in LCH Section 1.1, are:

- PRR-00660-OP-3, *Control Effluents*, and
- PRR-00660-SU-2, *Provide Environmental Services*.

Nuclear Substances – Derived Release Limits (DRLs)

The licensee shall control radiological releases to ALARA, within the DRLs, and take action to investigate cause(s) and correct the cause(s) of increased releases. The licensee shall also monitor and report these releases.

The licensee shall establish the DRLs in accordance with CSA Standard N288.1. If any of the individual radionuclide DRLs are exceeded, or if the sum of individual releases (expressed as a fraction of the relevant DRL) exceeds unity, it indicates that the licensee is in non-compliance with the public dose limit of 1mSv/year as per the CNSC [Radiation Protection Regulations](#).

The DRLs are considered part of the licensing basis. Changes to these limits are subject to LCH Section G.1. The DRLs for this facility are provided in the table below. In the event of a discrepancy between the table below and the licensee documentation upon which the DRLs are based, the licensee documentation shall be considered the authoritative source providing the licensee has followed their change control process.

The licensee should review and, if necessary, revise and reissue the DRLs at least once every five years.

Nuclide	Air Pathway Annual DRL (Bq)	Seawater Pathway Annual DRL (Bq)	Nuclide	Air Pathway Annual DRL (Bq)	Seawater Pathway Annual DRL (Bq)
H-3	2.4 E17	4.5 E19	Xe-125	1.5 E18	-----
Be-7	1.2 E15	6.5 E14	Xe-131m	4.3 E19	-----
CO ₂ -14	1.2 E16	-----	Xe-133	1.2 E19	-----
C-14 _{part}	1.8 E16	3.7 E14	Xe-133m	1.3 E19	-----
Na-22	1.8 E12	1.4 E15	Xe-135	1.4 E18	-----
Na-24	1.5 E15	2.2 E15	Xe-135m	8.3 E17	-----
P-32	7.9 E12	1.3 E14	Xe-138	8.4 E16	-----
S-35	5.7 E13	5.2 E17	Cs-134	2.5 E12	8.6 E13
Cl-36	3.9 E12	1.0 E18	Cs-135	4.2 E13	5.7 E15
Ar-41	2.6 E17	-----	Cs-136	5.6 E13	7.2 E13
Sc-46	2.0E13	4.0 E13	Cs-137	1.1 E12	2.1 E14
Sc-47	5.4 E15	3.1 E14	Cs-138	4.2 E16	-----
Cr-51	3.0 E15	1.8 E16	Ba-140	7.1 E13	2.6 E14

Nuclide	Air Pathway Annual DRL (Bq)	Seawater Pathway Annual DRL (Bq)	Nuclide	Air Pathway Annual DRL (Bq)	Seawater Pathway Annual DRL (Bq)
Mn-54	1.3 E13	1.2 E13	La-140	8.8 E14	5.9 E14
Fe-55	6.5 E14	1.7 E13	Ce-141	3.9 E14	9.6 E13
Fe-59	5.0 E13	3.0 E12	Ce-143	6.4 E15	2.5 E13
Co-58	4.7 E13	3.0 E13	Ce-144	2.7 E13	6.6 E13
Co-60	8.1 E11	1.0 E13	Pr-143	4.4 E14	3.4 E15
Ni-63	3.5 E14	4.3 E15	Pm-147	7.3 E14	3.9 E15
Zn-65	5.0 E12	9.7 E12	Eu-152	8.3 E11	6.7 E14
Se-75	8.2 E12	4.0 E13	Eu-154	1.1 E12	5.0 E14
As-76	4.2E15	1.3 E15	Eu-155	3.6 E13	3.4 E15
Br-82	9.1 E14	6.5 E15	Gd-153	1.3 E14	4.0 E15
Kr-83m	6.6 E21	-----	Gd-159	3.9 E16	7.2 E15
Kr-85	4.7 E19	-----	Tb-160	3.6 E13	6.2 E14
Kr-85m	2.3 E18	-----	Hf-175	1.1 E14	7.1 E14
Kr-87	4.1 E17	-----	Hf-181	8.4 E13	3.8 E14
Kr-88	1.1 E17	-----	Hg-203	1.8 E13	2.5 E13
Rb-88	1.8 E17	-----	Ra-224	6.0 E13	1.1 E14
Sr-89	8.9 E13	6.1 E16	Ra-225	2.7 E12	4.9 E13
Sr-90	1.7 E12	5.9 E15	Ra-226	1.7 E11	2.6 E13
Y-90	5.0 E15	1.1 E15	Ra-228	1.3 E11	6.3 E12
Y-91	1.1 E14	9.7 E14	Th-228	6.7 E11	4.1 E12
Zr-95	2.2 E13	2.9 E14	Th-229	3.0 E11	2.6 E12
Nb-94	2.5 E11	3.5 E14	Th-231	2.1 E17	1.9 E15
Nb-95	1.1 E14	8.1 E14	Th-232	1.4 E11	2.1 E12
Mo-99	3.2 E15	2.4 E16	Th-234	1.1 E14	1.8 E14
Tc-99	4.3 E13	2.1 E14	Ac-228	-----	1.4E17
Tc-99m	1.1 E17	7.4 E17	Pa-233	6.8 E14	1.5 E15
Ru-103	1.3 E14	9.3 E13	Pa-234	6.5 E15	2.3 E15
Ru-106	1.2 E13	9.4 E13	U-232	1.3 E11	1.5 E14
Rh-103m	9.8 E19	-----	U-233	1.1 E12	9.9 E14
Ag-110m	5.1 E12	4.7 E12	U-234	1.2 E12	1.0 E15
Sn-113	4.1 E13	4.1 E12	U-235	9.1 E11	1.1 E15
In-113m	1.8 E17	5.8 E17	U-236	1.2 E12	1.1 E15
Sb-122	1.9 E15	4.1 E14	U-237	4.1 E15	2.7 E17
Sb-124	2.7 E13	1.3 E14	U-238	1.0 E12	1.1E15
Sb-125	8.5 E12	5.0 E14	Np-237	4.2 E11	2.8 E13
Te-125m	2.6 E14	2.4 E14	Np-239	5.5 E15	3.9 E15
Te-132	3.6 E14	6.7 E13	Pu-238	5.5 E11	3.1 E12
I-125	3.1 E13	4.4 E13	Pu-239	5.0 E11	2.9 E12
I-129	2.5 E12	7.1 E12	Pu-240	5.0 E11	2.9 E12
I-131	6.3 E13	3.4 E13	Pu-241	2.9 E13	1.4 E14
I-132	3.4 E16	4.4 E16	Pu-242	5.2 E11	3.0 E12
I-133	3.2 E15	1.0 E15	Am-241	7.2 E11	3.4 E12
I-134	6.5 E16	-----	Am-243	5.7 E11	3.1 E12
I-135	1.3 E16	2.5 E15	Cm-242	5.9 E12	7.1 E13
I(mfp)	3.9 E13	-----	Cm-244	1.2 E12	9.7 E12

Hazardous Substances

The licensee shall control hazardous substance releases according to the limits defined in the licensing basis in accordance with the applicable environmental compliance approvals and take action to identify and correct the cause(s) of increased releases.

Environmental Action Levels

NB Power shall develop and implement environmental Action Levels (EAL). The EALs are considered part of the licensing basis. Changes to these limits are subject to LC G.1.

The licensee should review and, if necessary revise the EALs at least once every five years in order to validate their effectiveness.

The licensee's Environmental Action Levels (EAL) are documented in EXP-03400-0004 *Radiation Protection Expectations and Directives*, a prior notification document under LCH Section 7.1.

For the licensee, the established EALs are ~1% of the DRLs for respective radionuclides released via airborne, waterborne or sewage discharge pathways. The EALs are considered part of the licensing basis. Changes to these limits are subject to LCH Section G.1.

The current EALs for Point Lepreau NGS are:

- a total weekly airborne release exceeds 1% weekly Derived Release Limits, and
- a total monthly liquid effluent release exceeds 1% monthly Derived Release Limits

Environmental Management System (EMS)

The objective of the environmental protection policies, programs and procedures is to establish adequate provision for the 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).

NB Power has established and implemented an environmental management program to assess environmental risks associated with its nuclear activities, and to ensure these activities are conducted in such a way that adverse environmental effects are prevented or mitigated.

CNSC regulatory document [REGDOC-2.9.1](#), ENVIRONMENTAL PROTECTION: ENVIRONMENTAL PRINCIPLES, ASSESSMENTS AND PROTECTIVE MEASURES outlines the requirements related to an environmental protection program..

NB Power is proceeding with the implementation REGDOC-2.9.1, Version 1.2 in accordance with the implementation plan below.

Protection of People

See the SpA for the Estimated Dose to Public below.

Estimated Dose to Public

The *Radiation Protection Regulations* prescribe the radiation dose limits for the general public of 1 mSv per calendar year. The licensee reports the estimated dose to the public from the Point Lepreau site annually, in accordance with REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants* (See LC 3.3), in the Environmental Protection report.

Environmental Risk Assessment (ERA)

CSA standard N288.6, ENVIRONMENTAL RISK ASSESSMENT AT CLASS I NUCLEAR FACILITIES AND URANIUM MINES AND MILLS outlines the requirements for an environmental risk assessment. This specific area provides an assessment of environmental risks associated with contaminants and physical stressors in the environment relevant to nuclear facilities, and to the short-term and long-term safety of human health and the environment.

The ERA provides the basis for the environmental monitoring program (CSA standard [N288.4](#)) and also the effluent monitoring program (CSA standard [N288.5](#)), including Radiological Environmental Monitoring Programs. The ERA shall be updated periodically with the results from the environmental and effluent monitoring programs in order to confirm the effectiveness of any additional mitigation measures needed.

NB Power submitted an Environmental Risk Assessment (ERA) in 2020 June and a revised ERA in 2021 June which was consistent with the requirements of CSA N288.6.

Thermal effluent plume monitoring

In 2020 June, NB Power submitted a thermal plume monitoring report the delineated the horizontal and vertical dimensions of the thermal plume, temperature change over ambient of the thermal plume at PLNGS, and a list of ecological receptors to assess potential effects of the plume in ERAs as per requirements of CSA N288.6.

Document #	Document Title	Prior Notification
SI-01365-P101	Developing and Maintaining the Environmental Management System	No
RD-01364-L1	Derived Release Limits for Radionuclides in Airborne and Liquid Effluents	Yes
IR-03541-HF02	Radiation Environmental Monitoring Program (REMP)	Yes
SDP-01368-P077	Monitor and Control Effluents	No
SDP-01368-A23	Workplace Hazardous Materials Information System (WHMIS)	No
GU-08300-0004	Handling and Storing Hazardous Materials	No

Guidance:

It is recommended the licensee provide to the CNSC a copy of the reports sent to the New Brunswick Department of Environment and Environment Canada on hazardous releases.

Guidance Publications			
Source	Document #	Document Title	Version
CSA	N288.2	Guidelines for Calculating the Radiological Consequences to the Public of a Release of Airborne Radioactive Material for Nuclear Reactor Accidents	2014 ^a
CSA	N288.3.4	Performance testing of nuclear air-cleaning systems at nuclear facilities	2013 ^b
CSA	N288.8	Establishing and implementing action levels for releases to the environment from nuclear facilities	2017 ^c

^aCSA N288.2 *Guidelines for Calculating the Radiological Consequences to the Public of a Release of Airborne Radioactive Material for Nuclear Reactor Accidents*, NB Power plans to be in compliance by 2021 December 31.

^bCSA N288.3.4 *Performance testing of nuclear air-cleaning systems at nuclear facilities, version 2021*: NB Power to submit an implementation plan by 2022, March 30.

^cCSAN288.8 *Establishing and implementing action levels for releases to the environment from nuclear facilities*, NB Power plans to be in compliance by 2025 December 15.

DRAFT

10 SCA – EMERGENCY MANAGEMENT AND FIRE PROTECTION

The emergency management and fire protection SCA includes the following SpAs:

- Conventional emergency preparedness and response (includes the emergency preparedness program) (LC 10.1);
- Nuclear emergency preparedness and response (LC 10.1); and
- Fire emergency preparedness and response (LC 10.2).

10.1 Emergency Preparedness Program

Licence Condition 10.1:

The licensee shall implement and maintain an emergency preparedness program.

Preamble:

Emergency preparedness allows preparation and management of resources for responding to emergencies, with the aim to reduce the harmful effects of an emergency. Specific provisions for dealing with emergencies are required because normal processes are disrupted and a different set of resources is needed to respond to and recover from the disruption.

The licensee also has processes in place to ensure business continuity in the event of an emergency (see LC 1.1).

In addition to the nuclear emergency program, the licensee maintains a set of emergency operating procedures and abnormal plant operating procedures (see LC 3.1).

A security response to malevolent acts is governed by a separate plan under NBP's nuclear security program (see LC 12.1) but provisions of the licensee's site security report apply to any associated potential threat of release of radioactive material - for example, the need for off-site notification, situation updates and confirmation of any radioactive releases.

Liquid release response plan and radioactive materials transportation emergency response plan are also governed by separate plans (see LC 9.1, 12.1 and 14.1, respectively).

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure emergency preparedness as set out in the licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 2.10.1	Nuclear Emergency Preparedness and Response	2016	Implemented

Conventional and Nuclear Emergency Preparedness and Response

Emergency Preparedness Program

The licensee shall implement and maintain programs to ensure emergency preparedness. These programs shall comply with the requirements set out in CNSC regulatory document REGDOC 2.10.1 *Nuclear Emergency Preparedness and Response*.

The licensee main support process document which describes the emergency preparedness program is, PRR-00660-SU-5, *Provide Emergency Preparedness Services*, a written notification document listed under the management system in LCH Section 1.1.

The emergency preparedness program encompasses emergency preparedness, emergency response and emergency response measures. It ensures that appropriate emergency response capabilities are developed and maintained available for use. The emergency preparedness program consists of:

- basis for emergency planning, including BDBAs;
- personnel selection and qualification;
- emergency preparedness and response organizations;
- staffing levels;
- emergency training, drills and exercises;
- emergency facilities and equipment;
- emergency procedures;
- assessment of emergency response capability;
- assessment of accidents;
- activation and termination of emergency responses;
- protection of facility personnel and equipment,
- interface with off-site organizations;
- recovery program;
- public information program (see LC G.6); and
- public education program (see LC G.6).

The licensee Emergency Response Plan deals with emergency situations that could endanger the safety of on-site staff, the environment and the public. It is predominantly conceived to deal with releases of radioactive materials from fixed facilities and to outline interfaces with the New Brunswick Emergency Measures Organization (NB EMO) via the Point Lepreau Nuclear Off-Site Emergency Plan Volume II. . The licensee's technical planning basis for radiation emergencies is described in IR-78600-02, *Technical Planning Basis – Radiation Emergency*. Infrastructures defined within the Emergency Response Plan may be used in planning and response to virtually all emergencies.

The licensee is required to conduct Emergency Exercises and Drills as described in its emergency preparedness program. Participation by municipal and provincial emergency response groups is scheduled by mutual agreement.

The ability of the licensee to respond to fire emergencies is also considered; in addition to CNSC evaluations, it is also assessed by way of Third Party Audits of Industrial Fire Brigade (IFB) fire drills. The purpose of these audits is to analyze and ensure competencies of the IFB against the CSA N293 standard. See LCH Section 10.2 for additional details and version control of CSA N293.

Document #	Document Title	Prior Notification
SI-01365-EP02	Emergency Response Plan	Yes
SI-01365-EP01	Preparing and Maintaining the Emergency Response Plan	No
SDP-01368-EP02	Preparing and Implementing Emergency Procedures, Drills, and Exercises	No
SDP-03168-EP03	Maintaining, Testing and Expectations of Contingency Roster Personnel	No
IR-78600-02	Technical Planning Basis – Radiation Emergency	No

Guidance:

The requirements set out in CSA N1600, “General requirements for nuclear emergency management programs” are used as guidance regarding off-site provisions.

The licensee should provide emergency communications outlining what surrounding community residents need to know and do before, during and after a nuclear emergency. Information should be in plain language, readily accessible and include the following:

- how the public is notified of an emergency;
- what protective actions may be required during an emergency;
- what the public is expected to do, and why, when directed to take protective actions;
- what the public can do now to be better prepared for an emergency; and
- where can the public get more information on emergency plans.

Guidance:

Guidance publications			
Source	Document #	Document Title	Version
CNSC	REGDOC 2.3.2	Accident Management, Version 2	2015
CSA	N1600	General requirements for nuclear emergency management programs	2016

10.2 Fire Protection Program for the Nuclear Power Plant

Licence Condition 10.2:

The licensee shall implement and maintain a fire protection program for the Nuclear Power Plant.

Preamble:

Licensees require a comprehensive fire protection program (the set of planned, coordinated, controlled and documented activities) to ensure the licensed activities do not result in an unreasonable risk to the health and safety of persons and to the environment due to fire and to ensure that the licensee is able to efficiently and effectively respond to emergency fire situations.

Fire protection provisions, including response, are required for the design, construction, commissioning, operation, and decommissioning of nuclear facilities, including structures, systems, and components (SSCs) that directly support the plant and the protected area. External events such as an aircraft crash or threats are addressed in LCH Section 12.1.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure fire protection. These programs shall comply with the requirements set out in CSA standard N293 *Fire Protection for CANDU Nuclear Power Plants*.

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N293	Fire protection for CANDU nuclear power plants	2012 ^a	Implemented

^aCSA N293 *Fire Protection for Nuclear Plants R2017*: NB Power to implement this by 2025, January 30.

Fire Emergency Preparedness and Response

Fire Protection

CSA N293 contains specific requirements for deterministic analysis related to fire protection. CNSC staff review the fire safety assessment primarily to verify that the licensee employs appropriate assumptions, uses validated models, applies adequate scope, and demonstrates results that are within the design acceptance criteria.

The licensee shall assess the Fire Hazard Assessment and Fire Safe Shutdown Analysis revisions against the requirements of the CSA N293 and provide a justification of any non-conformances found and develop a plan for the execution of corrective actions to address the identified gaps.

As required by CSA N293, the licensee shall ensure that a qualified third party performs a plant condition inspection annually and a fire protection program (FPP) audit every three years. The resulting inspection and audit reports shall be submitted to CNSC staff (e-Doc 5888675).

The licensee shall design, build, modify and otherwise carry out work related to the nuclear facility with the potential to impact protection from fire in accordance with CSA N293. Any changes that have the potential to impact fire protection are assessed for compliance with CSA standard N293 and building code requirements for design and construction in accordance with the *National Building Code of Canada*. In addition, if required, an external third party review shall be performed and the results submitted to the CNSC.

Fire Response

As required by CSA N293, a review of the Industrial Fire Brigade (IFB) governance and performance shall be included in the FPP audit described above. The FPP audit shall include direct observation and assessment of at least one IFB fire response drill. The IFB drill assessment is to analyze and ensure competencies of the IFB against the CSA N293 standard and the NFPA standards referenced therein.

An independent third party auditor is required to be an expert in the discipline, normally firefighting and qualified through specific education and relevant experience. The third party auditor is required to be independent or at “arm’s length” from the facility to ensure impartiality. The review shall be of sufficient depth and detail to allow the reviewer to attest with reasonable confidence on the competencies of the IFB at the facility.

Fire Design

The licensee shall design, build, modify and otherwise carry out work related to the nuclear facility with the potential to impact protection from fire in accordance with the CSA N293. Any changes that have the potential to impact fire protection are assessed for compliance with CSA N293 and, if required, an external third party review shall be performed and the results submitted to the CNSC. See also LC 5.1 for additional requirements related to the Physical Design SCA and the design program and LC 5.2 for fire protection system classification and registration.

Document #	Document Title	Prior Notification
SI-01365-A236	Providing Fire Protection	No
0087-71400-3000-001-FHA-A-00	Fire Hazard Assessment for Point Lepreau Generating Station	Yes
0087-71400-3000-001-FSSA-A-00	Fire Safe Shutdown Analysis for Point Lepreau Generating Station	Yes
0087-71400-FIRE-001-CDCR-A	Code Compliance Review for Point Lepreau Generating Station	Yes
IR-78600-63	Technical Planning Basis – Fire Response	No

Guidance:

Where CSA N293 does not address a fire protection topic or issue in whole, or where additional guidance is beneficial, the standards and recommended practices set out by the NFPA are used as guidance by

CNSC staff in determining the adequacy of a fire protection measure. The guidance provided by the Nuclear Energy Institute in NEI 00-01 “Guidance for Post Fire Safe Shutdown Circuit Analysis” is used by CNSC staff to help determine the adequacy of safe shutdown electrical circuit analysis.

The results of the Third Party Audit report will typically consist of a report which compares the requirements of the applicable codes and standards against the implementation of the fire protection program or the Fire Response exercised (based on the scope of the audit). The report should identify any non-compliance and formulate a conclusion on whether the licensee fire protection program or IFB meets the requirements of N293.

As a guideline the report should provide sufficient detail to support the conclusion and to convey that the requirements of CSA N293 are met. As a minimum, the documentation for a Third Party Audit should include:

- Cover page with the name of the facility, date and signature of the authors;
- Name, address and phone number of the preparing agency or organization;
- Names of review team members, including brief descriptions of experience and education;
- Name, address, and phone number of the licensee;
- Title of report, name of the project, project number(s), date, and document number;
- Introduction briefly describing the project;
- Statement of review scope specifically listing any exclusions;
- Objectives of the review;
- A list of applicable codes and standards;
- Summary of the review methodology, including areas and documents reviewed;
- Detailed observations with relation to standard requirements against the observed response;
- Conclusions, including a statement that the response meets the requirements of the applicable standards, achieves the fire response objectives, and a summary of any non-compliances;
- Recommendations (if any); and
- An issue tracking table.

Guidance publications			
Source	Document #	Document Title	Version
NEI	NEI 00-01	Guidance for Post Fire Safe Shutdown Circuit Analysis	Rev. 2

11 SCA – WASTE MANAGEMENT

The waste management SCA includes the following SpAs:

- Waste characterization (LC 11.1);
- Waste minimization (LC 11.1);
- Waste management practices (LC 11.1); and
- Decommissioning plans (LC 11.2).

11.1 Waste Management Program

Licence Condition 11.1:

The licensee shall implement and maintain a waste management program.

Preamble:

The “waste management” safety and control area 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. This area also covers the planning for decommissioning.

CNSC Regulatory Document REGDOC-2.11 *Framework for Radioactive Waste Management and Decommissioning in Canada*, defines radioactive waste as any material (liquid, gaseous or solid) that contains a radioactive “nuclear substance,” as defined in section 2 of the NSCA, and which the owner has declared to be waste. In addition to containing nuclear substances, radioactive waste may also contain non-radioactive “hazardous substances,” as defined in section 1 of the *General Nuclear Safety and Control Regulations*.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure waste management as set out in the licensing basis (LCH Section G.1).

Licensing Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N292.0	General principles for the management of radioactive waste and irradiated fuel	2014 ^a	Implemented
CSA	N292.1	Wet storage of irradiated fuel and other radioactive materials	2016 ^b	Implemented
CSA	N292.2	Interim Dry Storage of Irradiated Fuel	2013 (R2018)	Implemented
CSA	N292.3	Management of Low and Intermediate-Level Radioactive Waste	2014	Implemented

Licensing Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC-2.11.1	Waste Management, Volume I: Management of Radioactive Waste	2021	TBD ^c

^aCSA N292.0 *General principles for the management of radioactive waste and irradiated fuel, version 2019: NB Power to submit an implementation plan by 2022, March 30.*

^bCSA N292.1 *Wet storage of irradiated fuel and other radioactive materials, R2021: NB Power to implement this version.*

^cREGDOC-2.11.1 *Waste Management, Volume I: Management of Radioactive Waste was issued in 2021, NB Power to submit an implementation plan on 2022 March 30.*

Waste Characterization/Waste Minimization/Waste Management Practices

Waste Management Program

The licensee shall implement and maintain a program for waste management that includes strategies for waste minimization. Low- and intermediate-level waste shall be managed in accordance with CSA N292.3, *Management of Low and Intermediate-Level Radioactive Waste*.

The licensee waste management program is described in SI-01365-P102, *Controlling Waste*. The licensee shall:

- characterize its waste streams and minimize the production of all wastes taking into consideration the health and safety of workers and the environment;
- integrate waste management programs as a key element of the facility safety culture; and
- audit on a regular basis its program to maximize its efficiency.

Waste management programs shall be developed to control the management of operational wastes (waste associated with the normal operation of a facility) at the facility where it is generated or stored.

Document #	Document Title	Prior Notification
SI-01365-P102	Controlling Waste	No

Guidance:

With respect to the storage and management of spent nuclear fuel, the waste management practices should reflect the fundamental safety concerns related to criticality, exposure, heat control, containment and retrievability. Namely, the systems that are designed and operated should assure subcriticality, control radiation exposure, assure heat removal, assure containment and allow retrievability.

11.2 Decommissioning Plan

Licence Condition 11.2:

The licensee shall maintain a decommissioning plan.

Preamble:

Paragraph 3(k) of the *Class I Nuclear Facilities Regulations* requires that a licence application contain the proposed plan for decommissioning of the nuclear facility.

This licence condition requires that the licensee maintain a preliminary decommissioning plan (PDP). A PDP provides an overview of the proposed decommissioning approach that is sufficiently detailed to assure that the proposed approach is, in the light of existing knowledge, technically and financially feasible, and appropriate in the interests of health, safety, security and the protection of the environment. The PDP defines areas to be decommissioned and the general structure and sequence of the principle work packages. The PDP forms the basis for establishing and maintaining a financial arrangement (financial guarantee – see LC G.5) that will assure adequate funding of the decommissioning plan.

It is expected that the PDP will be revised as the conditions at the facility change.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure a decommissioning strategy as set out in the licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CSA	N294	Decommissioning of facilities containing nuclear substances	2009 & Update 1 ^a	Implemented
CNSC	REGDOC-2.11.2	Decommissioning	2021 ^b	2025-PDP

^aCSA standard N294, *Decommissioning of facilities containing nuclear substances* was published in 2019. NB Power to include the requirements in 2025 Preliminary Decommissioning Plan.

^bREGDOC 2.11.2 *Decommissioning* was issued in 2021, NB Power to include the requirements in Preliminary Decommissioning Plan-2025

Decommissioning Plans

Clause 7.10 of CSA N286-12 describes some specific requirements to address decommissioning. See LCH Section 1.1 for version control of CSA N286-12.

The licensee is to notify the CNSC in writing of any changes to the *Preliminary Decommissioning Plan for the PLGS* and the *Decommissioning Cost Study for the PLGS* prior to implementation.

The preliminary decommissioning plan is to be revised at a minimum every five years, unless specified otherwise by the Commission. See REGDOC 3.1.1, “Reporting Requirements for Nuclear Power Plants” in LCH Section 3.3.

The *Preliminary Decommissioning Plan* and *Decommissioning Cost Study* are to be kept current to reflect any changes in the site or nuclear facility. They were revised and accepted by the CNSC on June 24, 2020. The licensee shall implement the requirements of CSA N294-19, *Decommissioning of facilities containing nuclear substances* for the next scheduled PDP revision.

Document #	Document Title	Prior Notification
N29-1387-003	Preliminary Decommissioning Plan for the Point Lepreau Generating Station (Includes the Decommissioning Cost Estimate)	Yes
N29-1704-001	Decommissioning Cost Study for the Point Lepreau Generating Station	Yes

Guidance:

CNSC regulatory document G-219 *Decommissioning Planning for Licensed Activities* provides guidance regarding the preparation of decommissioning plans for activities licensed by the CNSC. It also provides the basis for calculating the financial guarantees discussed in the regulatory document G-206 *Financial Guarantees for the Decommissioning of Licensed Activities* (further discussed under LCH Section G.5)

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC-3.3.1	Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities	2021

12 SCA – SECURITY

12.1 Nuclear Security Program

Licence Condition 12.1:

The licensee shall implement and maintain a security program.

Preamble:

CNSC regulatory document REGDOC 2.12.1 describes how, when required by a CNSC licence or order, a trained and equipped on-site nuclear response force shall be established and deployed at a nuclear facility.

The nuclear security program puts in place provisions to prevent, detect and stop malevolent acts, such as theft, sabotage, unauthorized access, illegal transfer or other acts involving nuclear material, other radioactive substances or their associated facilities.

The *Nuclear Security Regulations* require every licensee to: conduct, at least once every 12 months, a threat and risk assessment specific to a facility where it carries on licensed activities in order to determine the adequacy of its physical protection system; make modifications to its physical protection system, as necessary, to counter any credible threat identified as a result of the threat and risk assessment; keep a written record of each threat and risk assessment that it conducts and provide a copy of the written record, together with a statement of actions taken as a result of the threat and risk assessment, to the Commission within (within 60 days) after completion of the assessment.

The security SCA includes the following SpAs:

- Facilities and Equipment;
- Response arrangements;
- Security practices;
- Drills and exercises; and
- Cyber security.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure nuclear security as set out in the licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC-2.12.1	High Security Sites, Volume I: Nuclear Response Force, Version 2	2018	Implemented
CNSC	REGDOC-2.12.2	Site Access Security Clearance	2013	Implemented

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC-2.2.4	Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical and Psychological Fitness	2018	Implemented
CNSC	REGDOC-2.12.1	High-Security Facilities, Volume II: Criteria for Nuclear Security Systems and Devices	2018	Implemented
CSA	N290.7	Cyber security for nuclear power plants and small reactor facilities	2014	Implemented
CNSC	REGDOC-2.12.3	Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1	2020	Implemented

Facilities and Equipment Response Arrangements/Security Practices/Drills and Exercises

Nuclear Security Program

CNSC regulatory documents REGDOC-2.12.1 (Vol. I), REGDOC-2.2.4 (Vol. III), REGDOC 2.2.4 (Vol. II) and REGDOC-2.12.1 (Vol II) outline the requirements related to a nuclear security program.

The licensee main support process document which describes the security program is, PRR-006600-SU-6, *Provide Security Services*, a written notification document listed under the management system in LCH Section 1.1.

The licensee shall ensure the identified vital areas within the nuclear facility are protected against design basis threats and any other credible threat identified in the Threat and Risk Assessment documentation. The prime functions that must be maintained to prevent unacceptable radiological consequences are those of control, cool, and contain.

The licensee shall maintain the operation, design and analysis provisions credited in the above assessments as required to ensure adequate engineered safety barriers for the protection against malevolent acts. The provisions for the protection against malevolent acts shall be documented as part of a managed sub-program or process within the management system. The licensee shall summarize changes in design, analysis or operational procedures that are credited for the protection against malevolent acts in the annual threat and risk assessment, and submit a copy to the Commission upon request.

The licensee shall, in accordance with REGDOC-2.2.4 Vol. III to ensure the required documentation and necessary medical, physical, and psychological certification of a person is obtained before authorizing that person to act as a nuclear security officer.

All detection devices shall be installed, operated and maintained in accordance with the manufacturers' specifications and meet the criteria in REGDOC-2.12.1 Vol. II.

The licensee shall implement measures for the purpose of preventing and detecting unauthorized entry into a protected area or inner area at a high-security site, including:

- Vehicle barriers and vehicle access control points;
- Perimeter intrusion detection systems and devices;
- Closed-circuit video systems/devices for applications in a protected area or inner area;
- Security monitoring rooms; and
- Security monitoring room systems and devices.

The licensee shall implement the equipment for detecting concealed weapons and explosives at high-security sites, consisting of:

- explosive substances detection
- X-ray imaging
- metal detection devices.

Cyber Security

The licensee’s cyber security program shall be designed, implemented, and maintained in accordance with CSA N290.7 to protect cyber essential assets (CEAs) from cyber attacks. CEAs are cyber assets that perform or impact nuclear safety, nuclear security, emergency preparedness, and safeguard functions.

Document #	Document Title	Prior Notification
RD-01364-L025	Station Security Report	Yes
SDP-14000-SE02	Transporting Nuclear Material On-site	Yes
SI-01365-A094	Complying with Security Requirements	No
N/A	Tactical Deployment Plan	Yes
SDP-14000-SE19	Controlling and Maintaining Firearms, Ammunition and Less Lethal Weapons	No
SDP-14000-SE25	Organizing and Maintaining the Nuclear Response Team	No
87SE-01365-A116	Security Expectations	No
IR-05400-01	Cyber Security Program for Power Plant Systems, Site Security Systems and Emergency Preparedness Systems	No

Guidance:

It is recommended the licensee review and update RD-01364-L025, *Station Security Report*, six months prior to the expiry date of the licence or immediately following a significant change to the site security program. CNSC REGDOC-2.12.3 *Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material*, Version 2.1 provides guidance for preparing, submitting and revising the Station Security Report.

Guidance Publications			
Source	Document #	Document Title	Version
IAEA	IAEA Nuclear Security Series No. 4 Technical Guidance	Engineering Safety Aspects of the Protection of Nuclear Power Plants Against Sabotage	2007
IAEA	IAEA INFCIRC/225	IAEA Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities	Rev. 5
IAEA	IAEA Nuclear Security Series No. 17 Technical Guidance	Computer Security at Nuclear Facilities	2011
IAEA	IAEA Nuclear Security Series No. 33-T	Computer Security of Instrumentation and Control Systems at Nuclear Facilities	2018

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13 SCA – SAFEGUARDS AND NON-PROLIFERATION

13.1 Safeguards Program

Licence Condition 13.1:

The licensee shall implement and maintain a safeguards program.

Preamble:

Safeguards is a system of inspection and other verification activities undertaken by the International Atomic Energy Agency (IAEA) in order to evaluate the compliance of a Member State with its obligations pursuant to its safeguards agreements with the IAEA.

Canada has entered into a Safeguards Agreement and an Additional Protocol (hereafter referred to as “safeguards agreements”) with the IAEA pursuant to its obligations under the [Treaty on the Non-Proliferation of Nuclear Weapons](#) (INFCIRC/140). The objective of the Canada-IAEA safeguards agreements is for the IAEA to provide assurance on an annual basis to Canada and to the international community that all declared nuclear materials are in peaceful, non-explosive uses and there is no indication of undeclared nuclear materials or activities. This conclusion confirms that Canada is in compliance with its obligations under the following Canada-IAEA 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](#); and
- [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](#).

These are reproduced in information circulars INFCIRC/164, and INFCIRC/164/Add. 1.

The scope of the non-proliferation program under the licence is limited to tracking and reporting of foreign obligations and origins of nuclear material. This tracking and reporting assists the CNSC in the implementation of Canada’s bilateral Nuclear Cooperation Agreements with other countries. Additionally, the import and export of controlled nuclear substances, equipment and information identified in the [Nuclear Non-proliferation Import and Export Control Regulations](#) require separate authorization from the CNSC, consistent with Section 3(2) of the [General Nuclear Safety and Control Regulations](#). The guidance to seek such an authorization is provided in REGDOC-2.13.2, *Import and Export*.

The safeguards and non-proliferation SCA includes the following SpAs:

- Nuclear material accountancy and control;
- Access and assistance to the IAEA;
- Operational and design information;
- Safeguards equipment, containment and surveillance; and
- Import and Export (see above regarding separate authorization).

Compliance Verification Criteria:

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation Date
CNSC	REGDOC 2.13.1	Safeguards and Nuclear Material Accountancy	2018	Implemented

Safeguards Program

The licensee main core process which describes the safeguards program is PRR-00660-OP-4, *Fuel the Reactor*, a written notification document listed under the management system in LCH Section 1.1.

The licensee main core process which describes changes to safeguards measures is PRR-00660-DM-2, *Manage External Relationships*, a written notification document listed under the management system in LCH Section 1.1.

The licensee shall ensure the safeguards program is carried out in accordance with CNSC regulatory document REGDOC 2.13.1, *Safeguards and Nuclear Material Accountancy*.

To avoid a potential non-compliance with REGDOC-2.13.1, section 8.1.1, when the Nuclear Material Accountancy Reporting (NMAR) e-business system is not available, NB Power is to contact the CNSC International Safeguards Division (cns.sg.official.ccsn@canada.ca) to inform them of the issue and to seek guidance on how to fulfill reporting requirements. When NB Power inventory change documents and physical-key measurement point inventory summaries are submitted using alternate means, NB Power will still be required to re-submit using the NMAR e-business system once the NMAR system becomes available. For additional information see CNSC letter e-Doc 6032556.

The licensee shall not make changes to operation, equipment or procedures that would affect the implementation of safeguards measures, except with the prior written approval of the Commission or consent of CNSC staff as follows:

- Director, International Safeguards Division
- Director General, Directorate of Security and Safeguards
- Vice-President, Technical Support Branch

The licensee shall request prior written approval of the Commission, or consent of a person authorized by the Commission, for any changes to the operation, equipment or procedures requested by the licensee that would affect the implementation of safeguards measures.

With respect to the implementation of safeguards measures, changes made by the licensee to operation, equipment or procedures as a result of an agreement between the licensee, the CNSC and the IAEA are considered routine.

If a requested change would adversely impact Canada’s compliance with its safeguards agreements, CNSC staff does not have the authority to give approval, as this would violate the obligations arising from the Canada-IAEA safeguards agreement.

Document #	Document Title	Prior Notification
SI-01365-P95	Maintaining IAEA Safeguards	Yes
RD-01364-L7	Physical Accounting of Fuel	Yes

Guidance:

Guidance Publications			
Source	Document #	Document Title	Version
CNSC	REGDOC 2.13.2	Import and Export, Version 2	2018

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14 SCA – PACKAGING AND TRANSPORT

14.1 Packaging and Transport Program

Licence Condition 14.1:

The licensee shall implement and maintain a packaging and transport program.

Preamble:

Every person who transports radioactive material, or requires it to be transported, shall act in accordance with the requirements of the *Transportation of Dangerous Goods Regulations* (TDGR) and the *Packaging and Transport of Nuclear Substances Regulations, 2015* (PTNSR).

The TDGR and PTNSR provide specific requirements for the design of transport packages, the packaging, marking and labeling of packages and the handling and transport of nuclear substances.

The packaging and transport SCA includes the following SpAs:

- Package design and maintenance;
- Packaging and transport; and
- Registration for use.

Compliance Verification Criteria:

NB Power shall implement and maintain a packaging and transport program that will ensure compliance with the requirements set out in the TDGR and PTNSR for all shipments of nuclear substances to and from the Point Lepreau site. Shipments of nuclear substances within the nuclear facility where access to the property is controlled are exempted from the application of TDGR and PTNSR.

Document #	Document Title	Prior Notification
SI-01365-A78	Performing Outgoing Shipments	No
EP-78600-R024	Shift Supervisor Action – Request for Assistance for Radiation Incidents	No

Package Design and Maintenance

PTNSR 2015 applies to the packaging and transport of nuclear substances, including the design, production, use, inspection, maintenance and repair of packages, and the preparation, consigning, handling, loading, carriage and unloading of packages.

Where necessary, NB Power package designs are certified by the CNSC.

Packaging and Transport (Program)

The licensee shall implement and maintain a packaging and transport program that will ensure compliance with the requirements of the TDGR and the PTNSR 2015 for all shipments of nuclear substances to and from the Point Lepreau NGS site. Shipments of nuclear substances within the nuclear facility where access to the property is controlled are exempted from the application of TDGR and PTNSR 2015.

Registration and Use

NB Power's packaging and transport program also covers the registration for use of certified packages as required by the regulations.

Guidance:

Guidance Publications			
Org	Document #	Title	Version
CNSC	REGDOC 2.14.1	Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substance Regulations, 2015	2016

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15 SOLID RADIOACTIVE WASTE MANAGEMENT FACILITY

15.1 Solid Radioactive Waste Management Facility (SRWMF)

Licence Condition 15.1:

The licensee shall implement and maintain a waste management program for the Solid Radioactive Waste Management Facility (SRWMF).

Preamble:

This section has no content.

Compliance Verification Criteria:

The licensee shall implement and maintain a waste program for the Solid Radioactive Waste Management Facility (SRWMF).

The licensee main core process document which describes the SRWMF is SI-01365-P102, *Controlling Waste*.

Details on the waste storage facility can be found in the *Safety Report for the Solid Radioactive Waste Management Facility* and the *Operational Flowsheets* for each Phase:

- Phase I of the facility is used to store operational waste.
- Phase II is a dry storage facility for spent fuel.
- Phase II Extension – additional area prepared in 2006 to allow for dry storage of spent fuel. Approval is required in accordance with LC 16.2 prior to use/commissioning.
- Phase III of the facility store waste from retubing and other operations completed during the Refurbishment Outage.

Document #	Document Title	Prior Notification
SI-01365-P102	Controlling Waste	No
0087-79100-3010-001-SR-A	Safety Report – Solid Radioactive Waste Management Facility	Yes
0087-79100-2001-001-GA-D-12	Operational Flowsheet – Solid Radioactive Waste Management Facility – Phase I	No
0087-79100-2001-002-GA-D-13	Operational Flowsheet – Solid Radioactive Waste Management Facility – Phase II (<i>Shows the Phase II Extension</i>)	No
87-79100-2001-003-GA-D-00	Operational Flowsheet – Solid Radioactive Waste Management Facility – Phase III	No

Guidance:

There is none provided.

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15.2 Phase II Extension of the SRWMF

Licence Condition 15.2:

The licensee shall obtain written approval of the Commission, or consent of a person authorized by the Commission prior to the start of operations at the Phase II Extension of the SRWMF.

Preamble:

This section has no content.

Compliance Verification Criteria:

The SRWMF and the Phase II Extension are described including its location in the *Safety Report for the Solid Radioactive Waste Management Facility*, a prior written notification document listed in Section 15.1 of the LCH.

The request for approval shall provide assurance, in writing, that all of the operating requirements have been met. The request for approval will be carried out in consultation with the Director of Wastes and Decommissioning Division.

Guidance:

There is none provided.

15.3 Fire Protection Program for the SRWMF

Licence Condition 15.3:

The licensee shall implement and maintain a fire protection program for the SRWMF.

Preamble:

The *National Fire Code of Canada* and the *National Building Code* are both applicable when considering construction, operation, renovation or maintenance of buildings in the SRWMF.

The *National Fire Code of Canada* specifies the technical provisions regulating activities related to the operation and maintenance of buildings and facilities of the SRWMF, and the protection measures for the intended use of buildings.

CSA N393-13 *Fire protection for facilities that process, handle or store nuclear substances* applies for any new construction in the SRWMF and is expected to be implemented for existing structures.

Compliance Verification Criteria:

The licensee shall implement and maintain programs to ensure fire protection for the SRWMF as set out in the licensing basis (LCH Section G.1).

Licensing Basis Publications				
Source	Document #	Document Title	Version	Implementation
NRC	IRC-10NBC	National Building Code of Canada	2015	Implemented
NRC	IRC-10NFC	National Fire Code of Canada	2015	Implemented

Source	Document #	Document Title	Version	Implementation
CSA	N393	Fire protection for facilities that process, handle or store nuclear substances	2013	2022 Mar.31

The licensee shall ensure that the SRWMF complies with the National Building Code of Canada and the National Fire Code of Canada for all activities that have the potential to impact protection from fire, which includes:

- design, build, modify and other work; and
- operate, maintain, test, and inspect.

The licensee shall design, build, modify and otherwise carry out work related to the SRWMF, including the addition for the Phase II Extension, with the potential to impact protection from fire in accordance with CSA N393. In addition the licensee shall also comply with the building code requirements of the

National Building Code of Canada. An external third party review shall be performed and the results submitted to the CNSC.

Guidance:

There is none provided.

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15.4 Quarterly Reporting for the SRWMF

Licence Condition 15.4:

The licensee shall submit quarterly reports to the Commission on the activities at the SRWMF.

Preamble:

This licence condition applies specifically to the Solid Radioactive Waste Management Facility (SRWMF).

Compliance Verification Criteria:

The licensee shall submit the quarterly report within six weeks after each quarter of a calendar year. The report shall contain the following information:

- the principal licensed activities completed,
- the results of the monitoring programs and any approved modifications to the waste storage facility,
- a summary description of the waste storage facility events reported to the Commission pursuant to the [General Nuclear Safety and Control Regulations](#),
- a summary description of any changes in the methods, procedures and equipment used to carry out the licensed activities, and any modifications made to the waste storage facility.

Guidance:

There is none provided.

16 NUCLEAR FACILITY-SPECIFIC

16.1 Nuclear Substances and Prescribed Equipment

Licence Condition 16.1:

The licensee shall implement and maintain a program for nuclear substances and prescribed equipment.

Preamble:

New Brunswick Power has been authorized to use the types of nuclear substances and prescribed equipment listed in LPA-00583-2022.

Compliance Verification Criteria:

The licensee shall implement and maintain a nuclear substance and prescribed equipment program.

The licensee's main support process document which describes the program for nuclear substances and prescribed equipment is EXP-03400-0004 *Radiation Protection Expectations and Directives*.

Nuclear substances and prescribed equipment are used throughout the NB Power site, subject to the requirements of the program for nuclear substances and prescribed equipment.

The licensee is authorized to conduct licensed activities with the nuclear substances and the prescribed equipment listed in LPA-00583-2022 throughout the NB Power site. This includes use of the nuclear substances and the prescribed equipment to support dosimetry services authorized by CNSC licence 14910-2-25.1 and any subsequent amendments or renewals.

Prohibition of Human Use

The licensee is not authorized by the licence to conduct activities related to nuclear medicine and therefore it is prohibited to use nuclear substances in or on human beings.

CNSC staff will verify by whatever means available that the licensee is not using radioactive prescribed substances in or on humans.

List of areas, rooms and enclosures

The licensee shall maintain a list of all areas, rooms and enclosures in which more than one exemption quantity of a nuclear substance is used or stored. The current inventory included in LPA-00583-2022

Posting of Safety Posters

The licensee shall post and keep posted, in a readily visible location in the areas, rooms or enclosures where nuclear substances are handled, a radioisotope safety poster approved by the Commission or a

person authorized by the Commission, which corresponds to the classification of the area, room or enclosure.

Storage

The licensee shall:

- ensure that when in storage radioactive nuclear substances or radiation devices are accessible only to persons authorized by the licensee;
- ensure that the dose rate at any occupied location outside the storage area, room or enclosure resulting from the substances or devices in storage does not exceed 2.5 microSv/h; and
- have measures in place that the dose limits in the Radiation Protection Regulations are not exceeded as a result of the substances or devices in storage.

Area Classification

The licensee shall classify each room, area or enclosure where more than one exemption quantity of an unsealed nuclear substance is used at a single time as:

- basic-level if the quantity does not exceed 5 Annual Limit on Intake (ALI);
- intermediate-level if the quantity used does not exceed 50 ALI;
- high-level if the quantity does not exceed 500 ALI; or
- containment-level if the quantity exceeds 500 ALI;

Except for the basic-level classification, the licensee shall not use unsealed nuclear substances in these rooms, areas or enclosures without written approval of the Commission or a person authorized by the Commission.

Contamination Meter Requirements

The licensee shall make available to workers at all times at the site of the licensed activity a properly functioning portable contamination meter.

Survey Meter Requirements

The licensee shall provide at all times where nuclear substances, except for Hydrogen-3 and Nickel-63, are handled or stored a radiation survey meter.

Contamination Criteria

The licensee shall ensure that for nuclear substances listed in table 16.1, Classes of Radionuclides, given below:

- 1) non-fixed contamination in all areas, rooms or enclosures where unsealed nuclear substances are used or stored does not exceed:
 - a) 3 becquerels per square centimetre for all Class A radionuclides;
 - b) 30 becquerels per square centimetre for all Class B radionuclides;
 - c) 300 becquerels per square centimetre for all Class C radionuclides; averaged over an area not exceeding 100 square centimetres; and
- 2) non-fixed contamination in all other areas does not exceed:

- a) 0.3 becquerels per square centimetre for all Class A radionuclides;
- b) 3 becquerels per square centimetre for all Class B radionuclides;
- c) 30 becquerels per square centimetre for all Class C radionuclides; averaged over an area not exceeding 100 square centimetres.

The most commonly licensed radionuclides have been grouped into Class A, Class B and Class C, based upon their radiological properties as shown in the table below.

Table 16.1: Classes of Radionuclides

Class	Radionuclide				
Class A	All alpha emitters and their daughter isotopes				
	Ag-110m	Bi-210	Co-56	Co-60	Cs-134
	Cs-137	I-124	Lu-177m	Mn-52	Na-22
	Po-210	Pu-238	Pu-239	Pu-240	Sb-124
	Sc-46	Sr-82	U-234	U-235	U-238
	V-48	Zn-65			
Class B	Au-198	Ba-133	Br-82	Ce-143	Co-58
	Cu-67	Fe-59	Hg-194	Hg-203	I-131
	Ir-192	La-140	Mo-99	Nb-95	Pa-233
	Ra-223	Re-186	Re-188	Ru-103	Sb-122
	Sm-153	Sr-90	Xe-127	Y-86	Y-90
	Yb-169	Zr-89	Zr-95		
Class C	C-11	C-14	Ca-45	Cd-109	Ce-141
	Cl-36	Co-57	Cr-51	Cu-60	Cu-61
	Cu-64	F-18	Fe-55	Ga-67	Ga-68
	Ge-68	H-3	I-123	I-125	In-111
	In-113m	In-114	K-42	Kr-85	Lu-177
	Mn-52m	Mn-56	N-13	Na-24	Nb-98
	Ni-63	O-15	P-32	P-33	Pd-103
	Pr-144	Pu-241	Rh-106	S-35	Sc-44
	Sn-113	Sr-89	Tc-94m	Tc-99	Tc-99m
	Te-127	Tl-201	V-49	W-181	W-188
	Xe-133	Zn-63			

When using more than one radionuclide in a room, the radionuclide with the lowest contamination limit must be used to determine the limit, Class A, Class B or Class C that applies to the room.

Internal Authorization

The licensee shall ensure that:

- internal authorizations are issued in accordance with the licensee's internal authorization policies and procedures approved by the Commission or a person authorized by the Commission;
- internal authorization forms are posted in a readily visible location in or near each room, area or enclosure where nuclear substances and radiation devices are used or stored; and
- the licensed activity is conducted in accordance with the terms and conditions of the internal authorization.

Project Approval

The licensee shall obtain written approval from the Commission or a person authorized by the Commission before starting any work requiring the use of more than 10,000 exemption quantities of a nuclear substance at a single time.

Disposal (General)

When disposing of unsealed nuclear substances set out in table 16.2 column 1, Disposal Limits to municipal waste, to sewer systems or to the atmosphere, the licensee shall ensure that the concentration limit set out for each nuclear substance is not exceeded:

- a) The concentration limits set out in column 2 apply to quantities of solid waste of less than three tonnes per building per year. Nuclear substances released to the municipal garbage system must be in solid form and uniformly distributed in the waste with a concentration that is less than the limits in column 2. Where more than one nuclear substance is disposed of at one time, the sum of the quotients obtained by dividing the quantity of each substance by its corresponding limit in column 2 shall not exceed one.
- b) The limits set out in column 3 apply to the water soluble liquid form of each nuclear substance which may be disposed of per building per year. Where more than one nuclear substance is disposed of at one time, the sum of the quotients obtained by dividing the quantity of each substance by its corresponding limit in column 3 shall not exceed one.
- c) The concentration limits set out in column 4 may be averaged over a one-week period and apply to releases of less than 3 million cubic metres per year. Where more than one nuclear substance is disposed of at one time, the sum of the quotients obtained by dividing the quantity of each substance by its corresponding limit in column 4 shall not exceed one.

Table 16.2: Disposal Limits

Column 1	Column 2	Column 3	Column 4
Nuclear Substance	Solids to Municipal Garbage System (Qty per kg)	Liquids (Water Soluble) to Municipal Sewer System (Qty per year)	Gases to Atmosphere (Qty per cubic metre)
Americium 241	0.001 MBq	10 MBq	0.03 Bq
Antimony 124	0.37 MBq	0.1 MBq	N/A
Barium 133	0.037 MBq	1 MBq	N/A
Cadmium 109	0.37 MBq	10 MBq	N/A
Carbon 14	3.7 MBq	10000 MBq	N/A
Cerium 139	0.1 MBq	1 MBq	30 Bq
Cesium 134	0.01 MBq	0.1 MBq	N/A
Cesium 137	0.01 MBq	1 MBq	N/A
Chlorine 36	0.37 MBq	10000 MBq	N/A
Cobalt 57	0.37 MBq	1000 MBq	N/A
Cobalt 60	0.01 MBq	0.1 MBq	0.3 Bq
Hydrogen 3	37 MBq	1 TBq	37 kBq
Iron 55	3.7 MBq	10000 MBq	N/A
Mercury 203	0.1 MBq	10 MBq	N/A

Column 1	Column 2	Column 3	Column 4
Nuclear Substance	Solids to Municipal Garbage System (Qty per kg)	Liquids (Water Soluble) to Municipal Sewer System (Qty per year)	Gases to Atmosphere (Qty per cubic metre)
Natural Uranium	0.01 MBq	1.4 kg	N/A
Nickel 63	0.1 MBq	10000 MBq	N/A
Niobium 95	0.01 MBq	N/A	N/A
Strontium 85	0.1 MBq	1 MBq	N/A
Strontium 90	0.1 MBq	1 MBq	0.3 Bq
Tin 113	1 MBq	N/A	N/A
Yttrium 88	0.01 MBq	0.1 MBq	3 Bq

Decommissioning

The licensee shall ensure that prior to decommissioning any area, room or enclosure where the licensed activity has been conducted:

- 1) the non-fixed contamination for nuclear substances listed in the licence application guide table titled "Classification of Radionuclides" does not exceed:
 - a) 0.3 becquerels per square centimetre for all Class A radionuclides;
 - b) 3 becquerels per square centimetre for all Class B radionuclides;
 - c) 30 becquerels per square centimetre for all Class C radionuclides; averaged over an area not exceeding 100 square centimetres;
- 2) the release of any area, room or enclosure containing fixed contamination, is approved in writing by the Commission or person authorized by the Commission;
- 3) all nuclear substances and radiation devices have been transferred in accordance with the conditions of this licence; and
- 4) all radiation warning signs have been removed or defaced.

Sealed Source Tracking

Unless otherwise permitted by the prior written approval of the Commission or a person authorized by the Commission the licensee shall, in respect of a radioactive nuclear substance set out:

- 1) in table 16.3 column 1, report in writing to the Commission or a person authorized by the Commission any transfer, receipt, export, or import of a sealed source whose corresponding activity is equal to or greater than the value set out in column 2; or
- 2) in LPA-00583-2017, report in writing to the Commission or a person authorized by the Commission any transfer, receipt, import or export of any sealed source:
 - a) at least 7 days before any transfer or export; and
 - b) within 48 hours of any receipt of a transfer or import.

Table 16.3: Activity Limits for Tracking Transfer, Receipt, Export, or Import

Column 1	Column 2
Nuclear Substance	(TBq)
Americium 241	0.6
Americium 241/Beryllium	0.6

Column 1 Nuclear Substance	Column 2 (TBq)
Californium 252	0.2
Curium 244	0.5
Cobalt 60	0.3
Cesium 137	1
Gadolinium 153	10
Iridium 192	0.8
Promethium 147	400
Plutonium 238	0.6
Plutonium 239/Beryllium	0.6
Radium 226	0.4
Selenium 75	2
Strontium 90 (Yttrium 90)	10
Thulium 170	200
Ytterbium 169	3

The written report shall be in a form acceptable to the Commission that includes:

- 1) on transfer or export of a sealed source(s),
 - a) the date of transfer or export,
 - b) the export licence number (where applicable),
 - c) the name of the recipient and licence number or the name of the importer,
 - d) the address of the recipient's or importer's authorized location,
 - e) the nuclear substance (radionuclide),
 - f) activity (radioactivity) (Bq) per sealed source on the reference date,
 - g) the reference date,
 - h) the number of sealed source(s),
 - i) the aggregate activity (Bq),
 - j) the sealed source unique identifiers (if available), and
 - k) where the sealed source is incorporated in prescribed equipment,
 - i. the name and model number of the equipment, and
 - ii. the equipment serial number (if available)

- 2) on receipt or import of a sealed source(s),
 - a) the date of receipt of a transfer or import,
 - b) the name of the shipper and licence number or the name of the exporter,
 - c) the address of the shipper's or exporter's authorized location,
 - d) the nuclear substance (radionuclide),
 - e) activity (radioactivity) (Bq) per sealed source on the reference date,
 - f) the reference date,
 - g) the number of sealed source(s),
 - h) the aggregate activity (Bq),
 - i) sealed source unique identifiers (if available), and
 - j) where the sealed source is incorporated in prescribed equipment,
 - i. the name and model number of the equipment, and
 - ii. the equipment serial number (if available)

Annual Compliance Report for Nuclear Substances and Prescribed Equipment

The licensee is required to submit to the Commission the annual compliance report by March 31 of each year. The report shall include activities covering the nuclear substances and prescribed equipment listed in this section of the LCH.

The report shall include:

- information on the activities conducted during the previous year,
- the current inventory of radiation devices, sealed sources, and unsealed sources, and
- information on any transfers or disposals.

Import and Export Restrictions

The licensee shall not import or export any items described in the schedule, Parts A and B, to the [Nuclear Non-proliferation Import and Export Control Regulations](#), without a valid import/export licence issued by the CNSC.

The import or export licence issued by the CNSC includes licence conditions to verify compliance with the [Nuclear Non-proliferation Import and Export Control Regulations](#). CNSC inspectors can verify compliance by reviewing shipping documents pertaining to imports and exports.

Export Limitations – Sealed Sources

The licence does not authorize the licensee, in respect of a radioactive nuclear substance set out in table 16.4 column 1, to export a sealed source whose corresponding activity is equal to or greater than the value set out in column 2.

Document #	Document Title	Prior Notification
EXP-03400-0004	Radiation Protection Expectations and Directives	Yes
LPA-00583-2022	Table 10: Nuclear Substances - Point Lepreau NGS – Application to renew the PLNGS Power Reactor Operating Licence	Yes

Guidance:

Guidance Publications			
Source	Document #	Document Title	Version
CSA	N292.5	Guidelines for the exemption or clearance from regulatory control of materials that contain, or potentially contain nuclear substances	2011 ^a
CNSC	REGDOC-2.13.2	Import and Export, Version 2	2018

^aCSA N292.5, *Guidelines for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances* was published in 2017 (Update 1). NB Power to implement this by 2024, June 30.

APPENDIX A – Acronyms

The following is the list of acronyms used in the LCH:

AAGM	Alarming Area Gamma Monitor
AC	Alternating Current
ADL	Administrative Dose limits
AIA	Authorized Inspection Agency
AL	Action Level
ALARA	As Low As Reasonably Achievable
AMP	Ageing Management Plan
APOP	Abnormal Plant Operating Procedures
ASME	American Society of Mechanical Engineers
DBA	Design Basis Accident
BDBA	Beyond Design Basis Accident
BOP	Balance of Plant
CANDU	Canadian Deuterium Uranium
CAD	Completion Assurance Documents
CAR	Completion Assurance Report
CMD	Commission Member Document
CNSC	Canadian Nuclear Safety Commission
COG	CANDU Owners Group
CRF	Change Request Form
CSA	Canadian Standards Association
CSTR	Core Surveillance Testing Report
CVC	Compliance Verification Criteria
DBA	Design Basis Accidents
DC	Direct Current
DCR	Document Change Request
DEL	Derived Emission Limits
DG	Director General
DPRR	Directorate of Power Reactor Regulation
DRL	Derived Release Limits
EAL	Environmental Action Levels
EOC	Emergency Operations Centre
EPP	Equipment Program Plan
EPRI	Electrical Power Research Institute
EQ	Environmental Qualification
EME	Emergency Mitigating Equipment
ERA	Environmental Risk Assessment
ERT	Emergency Response Team
GD	Guidance Document
GEM	Gaseous Effluent Monitor
GSS	Guaranteed Shutdown State
HWA	High Wind Assessment
I&C	Instrumentation and Control
IAEA	International Atomic Energy Agency
IFB	Industrial Fire Brigade
IIP	Integrated Implementation Plan

ISI	In-Service Inspection
ISR	Integrated Safety Review
ITB	Iodine Thyroid Blocking
LC	Licence Condition
LCH	Licence Conditions Handbook
LEPM	Liquid Effluent Pipe Monitor
MSC	Minimum Shift Complement
NB Power	New Brunswick Power
NDE	Non-destructive Examination
NEW	Nuclear Energy Worker
NFPA	National Fire Protection Association
NGS	Nuclear Generating Station
NPP	Nuclear Power Plant
NSCA	<i>Nuclear Safety and Control Act</i>
NUREG	Nuclear Regulatory Guides
OP&P	Operating Policies and Principles
OPEX	Operating Experience
PCB	Polychlorinated Biphenyls
PIDP	Public Information and Disclosure Program
PIP	Periodic Inspection Program
PLNGS	Point Lepreau Nuclear Generating Station
PLRPD	Point Lepreau Regulatory Program Division
PRA	Probabilistic Risk Assessment
PROL	Nuclear Power Reactor Operating Licence
PSA	Probabilistic Safety Assessment
PSR	Periodic Safety Review
PTHA	Probabilistic Tsunami Hazard Assessment
RBGSS	Rod Based Guaranteed Shutdown State
RD	Regulatory Document
RTS	Return to Service
SAM	Severe Accident Management
SAMG	Severe Accident Management Guidelines
SAT	Systematic Approach to Training
SCA	Safety and Control Area
SIS	Systems Important to Safety
SMR	Security Monitoring Rooms
SOE	Safe Operating Envelope
SSCs	Systems, structures and components
SQ	Seismic Qualification
USNRC	United States Nuclear Regulatory Commission
WN	Written Notification

APPENDIX B – Glossary of Terms - Definitions

For definitions of terms used in this document, see REGDOC-3.6, *Glossary of CNSC Terminology*, which includes terms and definitions used in the NSCA and the regulations made under it, and in CNSC regulatory documents and other publications.

The following definitions, which are not formally defined in REGDOC-3.6, but applicable to this document.

Accept/ed/able/ance

Meet regulatory requirements, which means it is in compliance with regulatory documents or technical standards referenced in the licence.

Approval

Commission's permission to proceed, for situations or changes where the licensee would be:

- Not compliant with regulatory requirements set out in applicable laws and regulations, or
- Not compliant with a licence condition, or
- Not in the safe direction but the objective of the licensing basis is met.

Certified Staff

Trained licensee staff, certified by the Commission to be competent in completing tasks identified in their respective roles.

Compliance verification criteria

Criteria used to verify compliance with a licence condition. CVC provides the licensee and CNSC staff with detailed information to clarify regulatory requirements for compliance purposes.

Consent

Written permission to proceed, given by CNSC delegated authority, for situations or changes where the licensee would:

- Comply with regulatory requirements set out in applicable laws and regulations;
- Comply with a licence condition; and
- Not adversely impact the licensing basis.

Effective Date

The date that a given document becomes effective within the licensing period. The effective date is either set to the licence issue date or a future date when the given document becomes effective.

Extent of condition

An evaluation to determine if an issue has potential or actual applicability to other activities, processes, equipment, programs, facilities, operations or organizations.

Graduated enforcement

A process for escalating enforcement action. If initial enforcement action does not result in timely compliance, gradually more severe enforcement actions may need to be used. It takes into account such things as:

- The risk significance of the non-compliance with respect to health, safety, security, the environment and international obligations;
- The circumstances that lead to the non-compliance (including acts of willfulness);
- Previous compliance record;
- Operational and legal constraints (for example, Directive on the Health of Canadians); and
- Industry specific strategies.

[CNSC process document: Assure Compliance- “Select and Apply Enforcement Tools”]

Guidance

Non-mandatory suggestions on how to comply with the licence condition. Guidance may include regulatory advice and/or recommended industry best practices to guide the licensee towards a higher level of safety and/or fully satisfactory performance/implementation of its programs.

Important to safety

Items important to safety include, but are not limited to:

- Structures, Systems or Components (SSC) whose malfunction or failure could lead to undue radiation exposure of the facility/site personnel, or members of the public;
- SSCs that prevent anticipated operational occurrences from leading to accident conditions;
- Those features that are provided to mitigate the consequences of malfunctions or failures of SSCs; and
- Tasks, duties, activities, ageing mechanisms, findings, or any work that improperly performed could lead to radiation exposure of the facility/site personnel, or members of the public.

Levels 1 and 2 Outage Plans A level 1 outage plan is a schedule that identifies the key components of the finalized critical path, major projects and programs. A level 2 outage plan is a schedule that identifies the system windows with durations and is used to support Outage Schedule Risk Review.

Program(s)

A documented group of planned activities, procedures, processes, standards and instructions coordinated to meet a specific purpose.

Qualified Staff

Trained licensee staff, deemed competent and qualified to carry out tasks associated with their respective positions.

Regulatory undertakings

Refers to high level commitments that ensure safety, not component work orders or regulatory predefined maintenance tasks. The licensee’s deferral and Station Condition Record process focus on these lower level commitments.

Restart of the reactor

Removal of the Guaranteed Shutdown State (GSS).

Safe direction

Changes in plant safety levels which would not result in:

- A reduction in safety margins;

- A breakdown of barrier;
- An increase (in certain parameters) above accepted limits;
- An increase in risk;
- Impairment(s) of special safety systems;
- An increase in the risk of radioactive releases or spills of hazardous substances;
- Injuries to workers or members of the public;
- Introduction of a new hazard;
- Reduction of the defense-in-depth provisions;
- Reducing the capability to control, cool and contain the reactor while retaining the adequacy thereof; and
- Causing hazards or risks different in nature or greater in probability or magnitude than those stated in the safety analysis of the nuclear facility.

Safety and control measures

Measures or provisions that demonstrate that the applicant:

- (i) is qualified to carry on the licensed activities; and
- (ii) has made adequate provision for the protection of the environment, the health and safety of persons, the maintenance of national security and any measures required to implement international obligations to which Canada has agreed.

Written notification

A physical or electronic communication between a CNSC delegated authority and a person authorized to act on behalf of the licensee.

Written notification prior to implementation

CNSC must receive the written notification for the proposed changes within a reasonable time (based on the extent of the proposed changes and the potential impact on the safe operation of the facility) prior to the implementation. This will allow sufficient time for CNSC staff to review the submission and determine the acceptability.

APPENDIX C – List of CSA Documents and Other Standards

Document #	Document Title	Version	LC
N285.0 (combined with N285.6)	General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material Standards for reactor components for CANDU nuclear power plants	2017	5.2
N285.4	Periodic inspection of CANDU nuclear power plant components	2019	6.1
N285.4 – PIP GPB and Feeders	Periodic inspection of CANDU nuclear power plant components	2014 (R2019)	6.1
N285.4 – Fuel Channels	Periodic inspection of CANDU nuclear power plant components	2014 (R2019)	6.1
N285.4 – Steam Generator Tubes	Periodic inspection of CANDU nuclear power plant components	2009	6.1
N285.5	Periodic inspection of CANDU nuclear power plant containment components	2010 & Update 1 (2013 & 2018)	6.1
N285.7	Periodic inspection of CANDU nuclear power plant balance of plant systems and components	2015 (R2021)	6.1
N285.8	Technical requirements for in-service inspection evaluation of zirconium alloy pressure tubes in CANDU reactors	2010 (R2015)	6.1
N286-12	Management system requirements for nuclear facilities	2012 (R2017)	1.1
N286.0.1	Commentary on N286-12 Management system requirements for nuclear facilities	2021	1.1
N286.10	Configuration management for high energy reactor facilities	2016	1.1
N286.7	Quality assurance of analytical, scientific and design computer programs for nuclear power plants	1999	4.1
N286.7	Quality assurance of analytical, scientific and design computer programs for nuclear power plants	2016	4.1
N287.1	General requirements for concrete containment structures for nuclear power plants	2014 (R2019)	5.1 6.1
N287.2	Material requirements for concrete containment structures for CANDU nuclear power plants	2008 (R2017)	5.1 6.1
N287.3	Design requirements for concrete containment structures for nuclear power plants	2014	5.1
N287.4	Construction, fabrication, and installation requirements for concrete containment structures for CANDU nuclear power plants	2009 (R2014)	5.1
N287.5	Examination and testing requirements for concrete containment structures for nuclear power plants	2011	5.1

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Document #	Document Title	Version	LC
N287.6	Pre-operational proof and leakage rate testing requirements for concrete containment structures for nuclear power plants	2011 (R2021)	6.1
N287.7	In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plant components	2008 (R2017)	6.1
N287.8	Aging management for concrete containment structures for nuclear power plants	2015 (R2020)	6.1
N288.1	Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities	2014 (Update 3, 2018) (R2020)	9.1
N288.2	Guidelines for Calculating the Radiological Consequences to the Public of a Release of Airborne Radioactive Material for Nuclear Reactor Accidents	2014	9.1
N288.3.4	Performance testing of nuclear air-cleaning systems at nuclear facilities	2013 (R2021)	9.1
N288.4	Environmental monitoring program at Class I nuclear facilities and uranium mines and mills	2010 (R2019)	9.1
N288.5	Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills	2011	9.1
N288.6	Environmental risk assessments at Class I nuclear facilities and uranium mines and mills	2012	9.1
N288.7	Groundwater protection programs at Class I nuclear facilities and uranium mines and mills	2015 (R2020)	9.1
N288.8	Establishing and implementing action levels for releases to the environment from nuclear facilities	2017	9.1
N289.1	General requirements for seismic design and qualification of CANDU nuclear power plants	2008 (R2018)	5.3
N289.2	Ground motion determination for seismic qualification of nuclear power plants	2010 (R2021)	5.3
N289.3	Design procedures for seismic qualification of nuclear power plants	2010 (R2020)	5.3
N289.4	Testing procedures for seismic qualification of nuclear power plant structures, systems, and components	2012 (R2019)	5.3
N289.5	Seismic instrumentation requirements for nuclear power plants and nuclear facilities	2012 (R2017)	5.3
N290.0	General requirements for safety systems of NPPs	2017	5.1
N290.1	Requirements for the shutdown systems of nuclear power plants	2013	5.1
N290.2	Requirements for emergency core cooling systems for nuclear plants	2011 (R2017)	5.1
N290.3	Requirements for the containment system of nuclear power plants	2016	5.1

APPENDIX C – List of CSA Documents and Other Standards

Document #	Document Title	Version	LC
N290.4	Requirements for reactor control systems of nuclear power plants	2011 (R2019)	5.1
N290.5	Requirements for electrical power and instrument air systems of CANDU nuclear power plants	2006 (R2016)	5.1
N290.6	Requirements for monitoring and display of nuclear power plant safety functions in the event of an accident	2009 (R2016)	5.1
N290.7	Cyber security for nuclear power plants and small reactor facilities	2014	12.1
N290.11	Requirements for reactor heat removal capability during outage of nuclear power plants	2013	3.1
N290.12	Human factors in design for nuclear power plants	2014 (R2019)	5.1
N290.13	Environmental qualification of equipment for nuclear power plants	2018	5.3 6.1
N290.14	Qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants	2015 (R2020)	5.1
N290.15	Requirements for the safe operating envelope for nuclear power plants	2019	3.1
N290.16	Requirements for beyond design basis accidents	2016 (R2021)	3.1
N290.17	Probabilistic Safety Assessment for Nuclear Power Plants	2017	4.1
N290.18	Periodic safety review for nuclear power plants	2017	6.1
N291	Requirements for safety-related structures for CANDU nuclear power plants	2008 & Update 1 & Update 2	5.1
N291	Requirements for safety-related structures for CANDU nuclear power plants	2015	5.1
N292.0	General principles for the management of radioactive waste and irradiated fuel	2014 (R2019)	11.1
N292.1	Wet storage of irradiated fuel and other radioactive materials	2016 (R2021)	11.1
N292.2	Interim dry storage of irradiated fuel	2013 (R2018)	11.1
N292.3	Management of Low and Intermediate-Level Radioactive Waste	2014	11.1
N292.5	Guidelines for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances	2011 (R2017)	16.1
N293	Fire protection for CANDU nuclear power plants	2012 (R2017)	10.2
N294	Decommissioning of facilities containing nuclear substances	2009 & Update 1	11.2

APPENDIX C – List of CSA Documents and Other Standards

Document #	Document Title	Version	LC
N294	Decommissioning of facilities containing nuclear substances	2019 (Update 1)	11.2
N393	Fire protection for facilities that process, handle or store nuclear substances	2013	15.3
N1600	General requirements for nuclear emergency management programs	2016	10.1
NRC IRC-10NBC	National Building Code of Canada	2010	15.3
NRC IRC-10NFC	National Fire Code of Canada	2010	15.3

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APPENDIX D – List of CNSC Regulatory Documents

Document #	Document Title	Version	LC
AECB 1059	Reactor Licensing and Safety Requirements, Hurst and Boyd	1972	G.3 4.1
REGDOC-3.5.3	Regulatory Fundamentals	2018	G.1
G-206	Financial Guarantees for the Decommissioning of Licensed Activities	2000	G.5 11.2
REGDOC-3.3.1	Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities	2021	G.5 11.2
REGDOC-3.2.1	Public Information and Disclosure	2018	G.6
REGDOC-3.2.2	Indigenous Engagement, Version 1.1	2019	G.6
REGDOC-2.1.1	Management System	2019	1.1
REGDOC-2.1.2	Safety Culture	2018	1.1
REGDOC-2.2.1	Human Factors	2019	2.1
REGDOC-2.5.1	General Design Considerations: Human Factors	2019	2.1 5.1
REGDOC-2.2.5	Minimum Staff Complement	2019	2.1 2.2
REGDOC-2.2.4	Fitness for Duty: Managing Worker Fatigue	2017	2.1
REGDOC-2.2.4	Fitness for Duty, Volume II: Managing Alcohol and Drug Use	2021	2.1
REGDOC-2.2.4	Fitness for Duty, Volume III Nuclear Security Officer Medical, Physical, Psychological Fitness	2018	2.1
REGDOC-2.2.2	Personnel Training	2016	2.3 2.4
REGDOC-2.2.3	Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants	2019	2.3 2.4
EG1	Requirements and Guidelines for Written and Oral Certification Examinations for Shift Personnel at Nuclear Power Plants	2005	2.4
EG2	Requirements and Guidelines for Simulator-based Certification Examinations for Shift Personnel at Nuclear Power Plants	2004	2.4
N/A	Requirements for the Requalification Testing of Certified Shift Personnel at Nuclear Power Plants	Rev.2 2009	2.4
REGDOC-2.3.2	Accident management, Version 2	2015	3.1 10.1
REGDOC-2.5.1	General Design Considerations: Human Factors	2019	3.1

APPENDIX E – List of CNSC Regulatory Documents

Document #	Document Title	Version	LC
REGDOC-3.1.1	Reporting Requirements: Nuclear Power Plants	Version 2 2016	3.3
e-Doc 4525925	Interpretation of REGDOC 3.1.1 Reporting Requirements for Nuclear Power Plants	Rev. 1	3.3
REGDOC-2.3.3	Periodic Safety Reviews	2015	6.1
RD-360	Life Extension of Nuclear Power Plants	2008	6.1
REGDOC-2.4.1	Deterministic Safety Analysis	2014	4.1
REGDOC-2.4.2	Probabilistic Safety Assessment (PSA) for Nuclear Power Plants	2014	4.1
REGDOC-2.5.2	Design of Reactor Facilities: Nuclear Power Plants	2014	5.1
REGDOC-1.1.3	Licence Application Guide: Licence to Operate a Nuclear Power Plant	2017	5.1
REGDOC-2.6.1	Reliability Programs for Nuclear Power Plants	2017	6.1
REGDOC-2.6.2	Maintenance Programs for Nuclear Power Plants	2017	6.1
REGDOC-2.6.3	Aging Management	2014	6.1
REGDOC-2.7.1	Radiation Protection	2021	7.1
REGDOC-2.7.2 Volume 1	Dosimetry: Ascertaining Occupational Dose	2021	7.1
REGDOC-2.8.1	Conventional Health and Safety	2019	8.1
REGDOC-2.9.1	Environmental Protection: Environmental Principles, Assessments and Protection Measures	2017	9.1
REGDOC-2.10.1	Nuclear Emergency Preparedness and Response, Version 2	2016	10.1
REGDOC-2.11.1	Waste Management, Volume I: Management of Radioactive Waste	2021	11.2
REGDOC-2.11.2	Decommissioning	2021	11.2
G-219	Decommissioning Planning for Licensed Activities	2000	11.2
REGDOC-2.12.1	High Security Sites, Volume I: Nuclear Response Force, Version 2	2018	12.1
REGDOC-2.12.1	High-Security Facilities, Volume II: Criteria for Nuclear Security Systems and Devices	2018	12.1
REGDOC-2.12.2	Site Access Security Clearance	2013	12.1
REGDOC-2.12.3	Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1	2020	12.1
REGDOC-2.2.4	Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical and Psychological Fitness	2018	12.1
REGDOC-2.13.1	Safeguards and Nuclear Material Accountancy	2018	13.1
REGDOC-2.13.2	Import and Export, Version 2	2018	13.1 16.3

APPENDIX E – List of CNSC Regulatory Documents

Document #	Document Title	Version	LC
REGDOC-2.14.1	Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substance Regulations, 2015	2016	14.1

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APPENDIX E – List of Other Documents

Document #	Document Title	Version	LC
COG 09-9030	Principles & Guidelines For Deterministic Safety Analysis	Rev. 3	4.1
COG 11-9023	Guidelines for Application of the LOE/ROE Methodology to Deterministic Safety Analysis	Rev. 1	4.1
COG 06-9012	Guidelines for Application of the Best Estimate Analysis and Uncertainty (BEAU) Methodology to Licensing Analysis	Rev. 1	4.1
COG 08-2078	Principles and Guidelines for NOP/ROP Trip Setpoint Analysis for CANDU Reactors	Rev. 1	4.1
COG 13-9035	Derived Acceptance Criteria For Deterministic Safety Analysis	Rev. 0	4.1
UFC 3-340-02	Structures to Resist the Effects of Accident Explosions	2014	5.1
COG-07-4089	Fitness-for-Service Guidelines for Steam Generator and Preheater Tubes	2016	6.1
IAEA Specific Safety Guide No. SSG-25	Periodic Safety Review for Nuclear Power Plants	2013	6.1
NEI 00-01	Guidance for Post Fire Safe Shutdown Circuit Analysis	Rev. 2	10.2
IAEA Nuclear Security Series No. 4 Technical Guidance	Engineering Safety Aspects of the Protection of Nuclear Power Plants Against Sabotage	2007	12.1
IAEA INFCIRC/225	IAEA Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities	Rev. 5	12.1
IAEA Nuclear Security Series No. 17 Technical Guidance	Computer Security at Nuclear Facilities	2011	12.1
IAEA Nuclear Security Series No. 33-T	Computer Security of Instrumentation and Control Systems at Nuclear Facilities	2018	12.1

APPENDIX F – List of Licensee Documents Requiring Written Notification and Prior Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
GENERAL			
0086-10200-3001-001-SP-E	Site Plan Drawing	WN	G.3
0086-10200-3001-002-SP-E	Site Plan Drawing	WN	G.3
PRR-00660-DM-1	Direct and Manage the Business	WN	1.1
Schedule A	CNSC Financial Security and Access Agreement	PN	G.5
SI-01365-A75	Providing Internal Communication	WN	G.6
MANAGEMENT SYSTEM			
NMM-00660	Nuclear Management Manual	PN	1.1
Nuclear Management Manual Support Processes (Applicable throughout the LCH)			
PRR-00660-DM-2	Manage External Relationships	WN	1.1
PRR-00660-DM-3	Manage Independent Nuclear Oversight	WN	1.1
PRR-00660-DM-4	Assess and Improve Performance	WN	1.1
PRR-00660-DM-5	Manage Processes	WN	1.1
PRR-00660-OP-1	Control and Monitor Station Equipment	WN	1.1
PRR-00660-OP-2	Control Chemistry	WN	1.1
PRR-00660-OP-3	Control Effluents	WN	1.1
PRR-00660-OP-4	Fuel the Reactor	WN	1.1
PRR-00660-MA-2	Provide Planning and Scheduling Services	WN	1.1
PRR-00660-MA-3	Perform Maintenance	WN	1.1
PRR-00660-ME-1	Establish Maintenance Programs	WN	1.1
PRR-00660-ME-2	Monitor and Manage System Health	WN	1.1
PRR-00660-MS-1	Develop Modifications	WN	1.1

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
PRR-00660-MS-2	Implement Modifications	WN	1.1
PRR-00660-MS-3	Maintain Design and Safety Basis	WN	1.1
PRR-00660-SU-1	Provide Human Resources	WN	1.1
PRR-00660-SU-2	Provide Environmental Services	WN	1.1
PRR-00660-SU-3	Provide Training	WN	1.1
PRR-00660-SU-4	Provide Personnel Safety Services	WN	1.1
PRR-00660-SU-5	Provide Emergency Preparedness Services	WN	1.1
PRR-00660-SU-6	Provide Security Services	WN	1.1
PRR-00660-SU-9	Provide Documents and Records	WN	1.1
PRR-00660-SU-10	Provide Project Services	WN	1.1
PRR-00660-SU-11	Provide Facilities	WN	1.1
PRR-00660-SU-12	Provide Materials and Services	WN	1.1
SI-01365-TR25	Systematic Approach to Training Processes	WN	1.1
GU-97214-001	Training Program Management	WN	1.1
Other Documents			
SI-01365-A76	Managing Change	WN	1.1
SI-01365-A234	Providing Nuclear Safety Oversight	WN	1.1
SDP-78600-0001	Pandemic Response Plan	WN	1.1
SI-01365-A62	Self-Assessments and Benchmarking	WN	1.1
SI-01365-A88	Performing Internal Independent Nuclear Oversight	WN	1.1
SDP-01368-A44	Conducting Nuclear Safety Culture Assessment and Nuclear Safety Culture Monitoring Panel	WN	1.1
HUMAN PERFORMANCE MANAGEMENT			

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
SI-01365-A131	Human Performance Process	WN	2.1
SI-01365-A106	Controlling Hours of Work for Shift Workers	PN	2.1
SI-01365-A45	Controlling Hours of Work for Regular Day Workers	PN	2.1
SDP-01368-CA09	Conducting Human Performance Event Evaluations and Lessons Learned	WN	2.1
IR-00583-01	Fitness for Duty Program	WN	2.1
SI-01365-A133	Implementing the Fitness for Duty Program	WN	2.1
SI-01365-A071	Controlling Documents	WN	2.1
SDP-01368-A037	Continuous Behaviour Observation Program	WN	2.1
SDP-01368-P36	Meeting Minimum Operational Staffing Requirements	PN	2.2
PRR-00660-SU-3	Provide Training	WN	2.3
SI-01365-TR25	Systematic Approach to Training Process	WN	2.3
GU-97214-0011	Training Program Management	WN	2.3
PRR-00660-OP-1	Control and Monitor Station Equipment	WN	2.3
PRR-00660-OP3	Control Effluents	WN	2.3
PRR-00660-SU-4	Provide Personnel Safety Services	WN	2.3
PRR-00660-SU-2	Provide Environmental Services	WN	2.3
IR-03541-0011	Senior Health Physicist Roles and Responsibilities at PLNGS	PN	2.4
EXP-08700-0010	Operations Expectations and Practices	PN	2.4
TPD-97177-01	Shift Supervisor Incremental Training Program	WN	2.4
TPD-97170-01	Control Room Operator Candidate Training Program Description	WN	2.4
TPD-97179-01	Certified Staff Continuing Training Program Description	WN	2.4
TPD-97215-01	Senior Health Physicist Certification Training Program	WN	2.4
SDP-01368-TR06	Simulator Certification Examinations	PN	2.4
SDP-01368-TR07	Simulator Comprehensive Examinations	WN	2.4
SDP-01368-TR08	Development and Administration of Knowledge-Based Written and Oral Examinations for Initial Certification Training Programs	PN	2.4

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
SDG-97173-0004	Generals program initial certification standards for development and administration of closed reference multiple choice written examinations questions	PN	2.4
SDP-01368-TR15	Testing Certified Shift Personnel for Requalification	WN	2.4
OPERATING PERFORMANCE			
EXP-08700-0010	Operations Expectations and Practices	PN	3.1
SI-01365-P103	Managing Significant Issues	WN	3.1
SI-01365-P99	Monitoring and Operating Station Equipment	WN	3.1
SI-01365-P01	Work Protection	WN	3.1
SI-01365-T32	Using Operating Experience	WN	3.1
SDP-01368-P30	Maintaining Plant Status Change Control	WN	3.1
SDP-01368-P22	Controlling the Guaranteed Shutdown State	PN	3.1
SDP-01368-P27	Performing Technical Operability Evaluations	WN	3.1
SI-01365-A63	Implementing the Corrective Action Process	WN	3.1
RD-01364-L3	Operating Policies and Principles	PN	3.1
RD-01364-L23	Solid Radioactive Waste Management Facility Operating Policies and Principles	PN	3.1
SOE-68200-01	Safe operating envelope for the PLGS shutdown system number one (SDS1) SOE overview	WN	3.1
SOE-68300-01	Safe operating envelope for the PLGS shutdown system number two SDS2	WN	3.1
SOE-68400-01	Safe operating envelope for the PLGS containment system	WN	3.1
SOE-34320-01	Safe operating envelope for the PLGS emergency core cooling system under full power operation ECC SOE overview	WN	3.1
SOE-03100-01	Safe operating envelope for PLGS reactor physics parameters	WN	3.1
SOE-32110-01	Safe operating envelope for the PLGS moderator and cover gas systems	WN	3.1
SOE-33300-01	Safe operating envelope for the PLGS pressure and inventory control system	WN	3.1
SOE-33410-01	Safe operating envelope for the PLGS shutdown cooling system	WN	3.1

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
SOE-34110-01	Safe operating envelope for the PLGS shield cooling system	WN	3.1
SOE-34610-01	Safe operating envelope for the PLGS emergency water supply, boiler make-up water and emergency power supply systems	WN	3.1
SOE-35000-01	Safe operating envelope for the PLGS fuel handling systems	WN	3.1
SOE-43230-01	Safe operating envelope for the PLGS auxiliary boiler feedwater system	WN	3.1
SOE-50000-01	Safe operating envelope for the PLGS electrical power system	WN	3.1
SOE-68000-01	Special safety system trip parameter surveillance limits for normal operation	WN	3.1
SOE-71300-01	Safe operating envelope for the PLGS raw service water and recirculated cooling water systems	WN	3.1
SOE-73160-01	Safe operating envelope for the PLGS emergency filtered containment venting (EFCV) system	WN	3.1
SOE-75120-01	Safe operating envelope for the PLGS instrument air system	WN	3.1
SOE-68200-02	SDS1 safe operating envelope implementation report	WN	3.1
SOE-68300-02	SDS2 safe operating envelope implementation report	WN	3.1
SOE-68400-02	Containment safe operating envelope implementation report	WN	3.1
SOE-34320-02	ECC safe operating envelope implementation report	WN	3.1
SOE-03100-02	Safe operating envelope for the reactor physics parameters implementation report	WN	3.1
SOE-32110-02	Moderator and cover gas systems safe operating envelope implementation report	WN	3.1
SOE-33300-02	Ht pressure and inventory control system safe operating envelope implementation report	WN	3.1
SOE-33410-02	Shutdown cooling system safe operating envelope implementation report	WN	3.1
SOE-34110-02	End shield cooling system safe operating envelope implementation report	WN	3.1

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
SOE-34610-02	Emergency water supply, boiler make-up water and emergency power supply systems safe operating envelope implementation report	WN	3.1
SOE-35000-02	Fuel handling SOE implementation	WN	3.1
SOE-43230-02	Auxiliary boiler feedwater system safe operating envelope implementation report	WN	3.1
SOE-50000-02	Electrical power system safe operating envelope implementation report	WN	3.1
SOE-68000-02	Special safety system trip parameter surveillance limits implementation report	WN	3.1
SOE-71300-02	Raw service water and recirculating cooling water system safe operating envelope implementation report	WN	3.1
SOE-73160-02	Emergency filtered containment venting system safe operating envelope implementation report	WN	3.1
SOE-75120-02	Instrument air system safe operating envelope implementation report	WN	3.1
SI-01365-T112	Maintaining the safe operating envelope	PN	3.1
SDP-01368-SA04	Safe operating envelope methodology	WN	3.1
SDP-01368-SA06	Implementing the safe operating envelope	WN	3.1

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
0087-78600-SAMG-CR1-EP	Severe Accident Management Guidelines Control Room Guide #1 Shift Supervisor Initial Response	WN	3.1
0087-78600-SAMG-015-IR	Basis For SAMG/SACRG1 Initial Response	WN	3.1
0087-78600-SAMG-CR2-EP	Severe Accident Management Guidelines Control Room Guide #2 ICS Planning Section Functional	WN	3.1
0087-78600-SAMG-016-IR	Basis For SAMG Control Room Guide #2 ICS Planning Section Functional	WN	3.1
0087-78600-SAMG-DFC-EP	Diagnostic Flowchart – Severe Accident Management Guidelines	WN	3.1
0087-78600-SAMG-017-IR	Diagnostic Flowchart (DFC) Basis Document	WN	3.1
0087-78600-SAMG-SCT-EP	Severe Challenge Status Tree – Severe Accident Management Guidelines	WN	3.1
0087-78600-SAMG-018-IR	Severe Accident Management Guidelines Severe Challenge Status Tree Basis Document	WN	3.1
0087-78600-SAMG-SD1-EP	Severe Accident Management Guide For Outages (Shutdown State)	WN	3.1
PRR-00660-DM-4	Assess and Improve Performance	WN	3.3
PRR-00660-DM-2	Manage External Relationships	WN	3.3
SAFETY ANALYSIS			
Safety Analysis			
PRR-00660-MS-3	Maintain Design and Safety Basis	WN	4.1
0087-01322-3009-001-SR-A	PLNGS – Unit 1 Safety Report: Part 1 – Design Description	PN	4.1
0087-01322-3009-002-SR-A	PLNGS – Unit 1 Safety Report: Part 2 – Accident Analysis, Vol. 1 to 3	PN	4.1
0087-01322-3009-003-SR-A	Safety Report: Part 3 – Appendices	PN	4.1
SDP-01368-SA01	Performing Safety Analysis	WN	4.1
IR-78600-SAMG-11 & 12	Technical Basis for CANDU Severe Accident Management, Volumes 1 and 2 (Confidential)	WN	4.1
Probabilistic Safety Analysis			
IR-03610-03	Probabilistic Safety Assessment Program	WN	4.1
Design and Analysis Computer Codes and Software			

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
SI-01365-T83	Developing and Modifying Analytical, Scientific and Design Computer Programs	WN	4.1
SI-01365-T84	Implementing Analytical, Scientific, and Design Computer Programs	WN	4.1
PHYSICAL DESIGN			
EXP-08700-0007	Engineering Expectations	WN	5.1
SDP-01340-DS05	Modification Design Requirements	WN	5.1
SI-01365-T073	Responding to Requests for Design Modifications	WN	5.1
IR-03100-51	Core Surveillance and Testing Report: Post-Refurbishment Startup 2012 (e-Doc 5098638)	PN	5.1
IR-00911-01	CSA N285.0 Pressure Boundary Program Roadmap	WN	5.2
IR-00668-01	Pressure Boundary Program	WN	5.2
0087-01320-0001-001-OPR-A	Overpressure Protection Report	WN	5.2
IR-00668-003	ANSI/NBBI NB-23 Repair QA Program for Pressure Relief Valves	WN	5.2
EPP-30834-RV01	Equipment Program Plan for Overpressure Protection Devices	WN	5.2 6.1
SI-01365-T107	Requesting Pressure Boundary Classification	PN	5.2
SI-01365-T106	Requesting Pressure Boundary Registration and Reconciliation	WN	5.2
SCL-01345-3000	System Classification List	WN	5.2
N/A	Professional Services Agreement with Department of Public Safety Technical Inspection Services Branch	WN	5.2
EPP-60010-EQ01	Environmental Qualification Program	WN	5.3
IR-03500-39	Safety Assessment of Plant Operation Following Secondary Side Breaks in the Turbine Building	WN	5.3
SI-01365-P65	Establishing Equipment Environmental Qualification	WN	5.3
87-68000 DGS-013 (supplement to DG 6800 3)	Environmental Qualification of Safety Related Equipment	WN	5.3

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
DGA-68000-0003-001	Qualifying Safety Related Electrical and Instrumentation and Control Equipment for Environmental Services Conditions	WN	5.3
IR-60010-082	EQ Identification of Harsh Environment Areas Outside the Reactor Building	WN	5.3
SDP-60010-02	Preparing an Environmental Qualification Assessment (EQA)	WN	5.3
IR-60010-50	Normal Environmental Conditions	WN	5.3
FITNESS FOR SERVICE			
Reliability			
IR-01500-12	Reliability Program	WN	6.1
SI-01365-T23	Mandatory Surveillance Program	WN	6.1
IR-01500-14	Basis for List of Systems Important to Safety	WN	6.1
IR-01500-16	PSA Insight into Systems Important to Safety and Identification of Risk Related to Structures, Systems and Components	WN	6.1
Maintenance			
SI-01365-T89	Continuing Equipment Reliability Improvement Process	WN	6.1
SI-01365-P74	Managing Planned Outages	WN	3.1 6.1
Ageing Management			
IR-05000-06	Integrated Aging Management Program	WN	6.1
EPP-57000-01	Cable Preservation Program (CPP)	WN	6.1
EPP-67140-FTT1	Fire System Management Plan	WN	6.1
EPP-67140-FTT2	Fire Equipment Management Plan	WN	6.1
EPP-78600-EME1	Emergency Mitigation Equipment	WN	6.1
EPP-78600-ERT1	ERT Equipment Program Plan	WN	6.1
SI-01365-T54	System Performance Monitoring	WN	6.1
Chemistry Control			
SI-01365-P94	Controlling Station Chemistry	WN	6.1
Periodic and In-Service Inspection			
General Pressure Boundaries - CSA N285.4 Clauses 3- 11			

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
EPP-03641-PIP1	Equipment Program Plan for Periodic Inspection Program (PIP) CSA N285.4	PN	6.1
Fuel Channel Pressure Tubes - CSA N285.4 Clause 12 and CSA N285.8			
EPP-31100-FC01	Fuel Channel Management Plan	PN	6.1
IR-31110-0001-001-A	Compliance Plan for Long-Term Use of CSA N285.8-10 for In-Service Evaluation of Zirconium Alloy Pressure Tubes	PN	6.1
Fuel Channel Feeder Pipes – CSA N285.4 Clause 13			
EPP-03641-PIP1 (Appendix C)	Fuel Channel Feeder Pipes Periodic Inspection Program	PN	6.1
Steam Generator Tubes and Internals – CSA N285.4 Clause 14			
EPP-33110-SG01	Steam Generator Management Plan	PN	6.1
Concrete Components - CSA N285.5			
EPP-03642-PIP2	Equipment Program Plan for Periodic Inspection Program (PIP) CSA N285.5	PN	6.1
Concrete Containment Structures - CSA N287.7			
EPP-21000-RB01	Reactor Building Management Plan	PN	6.1
0087-21080-3001-001-TS-A	Standard Leak-Rate Test for CANDU 600 Containment Building	PN	6.1
Balance of Plant – CSA N285.7			
EPP-03646-FC01	Equipment Program Plan for Flow-Accelerated Corrosion	WN	6.1
EPP-30834-RV01	Equipment Program Plan for Overpressure Protection Devices	WN	5.2 6.1
EPP-30839-PV01	Equipment Program Plan for Air Operated Valves	WN	6.1
EPP-30839-MV01	Equipment Program Plan for Motor Operated Valves	WN	6.1
EPP-03644-PV01	Equipment Program Plan for Pressure Vessels	WN	6.1
SI-01365-T40	Enhanced Inspection of Secondary Side Pipework for Protection of the Main Control and Secondary Control Area	WN	6.1
EPP-03640-BP01	Buried Piping Integrity Program	WN	6.1
Periodic Safety Review			
SI-01365-A126	Conducting a Periodic Safety Review	WN	6.2
IR-03612-0023	Periodic Safety Review 2 (PSR2) Integrated Implementation Plan	PN	6.3
RADIATION PROTECTION			

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
EXP-03400-0004	Radiation Protection Expectations and Directives	PN	7.1 16.1
SDP-01368-A046	Controlling Radiation Exposures As Low As Reasonably Achievable (ALARA)	WN	7.1
IR-03400-02	Respiratory Protection Program	WN	7.1
IR-03541-06	Technical Basis for Management of Alpha Hazards at PLGS	WN	7.1
HP-03541-H100	How to Approve a Radiation Work Approval	WN	7.1
HP-03541-H101	Considerations for Pregnant and Breastfeeding NEWs	WN	7.1
RPP-03400-0009	Dosimetry	WN	7.1
SDP-01368-A042	Planning Radiation Work	WN	7.1
SDP-01368-A051	Establishing Exposure Limits	WN	7.1
IR-03400-0004	ALARA Five Year Plan	WN	7.1
IR-03541-0013	Technical Basis for Ascertaining and Assigning Lens of Eye Dose at PLNGS	WN	7.1
CONVENTIONAL HEALTH AND SAFETY			
SI-01365-A040	Maintaining the Joint Health and Safety Committee	WN	8.1
ENVIRONMENTAL PROTECTION			
SI-01365-P101	Developing and Maintaining the Environmental Management System	WN	9.1
RD-01364-L1	Derived Release Limits for Radionuclides in Airborne and Liquid Effluents	PN	9.1
IR-03541-HF02	Radiation Environmental Monitoring Program (REMP)	PN	9.1
SDP-01368-P077	Monitor and Control Effluents	WN	9.1
SDP-01368-A23	Workplace Hazardous Materials Information System (WHMIS)	WN	9.1
GU-08300-0004	Handling and Storing Hazardous Materials	WN	9.1
EMERGENCY MANAGEMENT AND FIRE PROTECTION			
SI-01365-EP02	Emergency Response Plan	PN	10.1
SI-01365-EP01	Preparing and Maintaining the Emergency Response Plan	WN	10.1
SDP-01368-EP02	Preparing and Implementing Emergency Procedures, Drills, and Exercises	WN	10.1

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
SDP-01368-EP03	Maintaining, Testing and Expectations of Contingency Roster Personnel	WN	10.1
IR-78600-02	Technical Planning Basis – Radiation Emergency	WN	10.1
IR-78600-63	Technical Planning Basis – Fire Response	WN	10.1
SI-01365-A236	Providing Fire Protection	WN	10.2
0087-71400-3000-001-FHA-A-00	Fire Hazard Assessment for Point Lepreau Generating Station	PN	10.2
0087-71400-3000-001-FSSA-A-00	Fire Safe Shutdown Analysis for Point Lepreau Generating Station	PN	10.2
0087-71400-FIRE-001-CDCR-A	Code Compliance Review for Point Lepreau Generating Station	PN	10.2
WASTE MANAGEMENT			
SI-01365-P102	Controlling Waste	WN	15.1
N29-1387-003	Preliminary Decommissioning Plan for the Point Lepreau Generating Station (Includes the Decommissioning Cost Estimate)	PN	11.2
N29-1704-001	Decommissioning Cost Study for the Point Lepreau Generating Station	PN	11.2
SECURITY			
RD-01364-L25	Station Security Report (Classified)	PN	12.1
SDP-14000-SE02	Transporting Nuclear Material On-site (Classified)	PN	12.1
SI-01365-A94	Complying with Security Requirements	WN	12.1
N/A	Tactical Deployment Plan (Classified)	PN	12.1
SDP-14000-SE19	Controlling and Maintaining Firearms, Ammunition and Less Lethal Weapons (Classified)	WN	12.1
SDP-14000-SE25	Organizing and Maintaining the Security Response Team (Classified)	WN	12.1
SI-01365-A116	Security Expectations (Classified)	WN	12.1
IR-05400-01	Cyber Security Program for Power Plant Systems, Site Security Systems and Emergency Preparedness Systems (Classified)	WN	12.1
SAFEGUARDS			
SI-01365-P95	Maintaining IAEA Safeguards	PN	13.1

APPENDIX F – List of Licensee Documents Requiring Written Notification

Document #	Document Title	Written Notification (WN) and Prior Notification (PN)	LC
RD-01364-L7	Physical Accounting of Fuel	PN	13.1
PACKAGING AND TRANSPORT			
SI-01365-A78	Performing Outgoing Shipments	WN	14.1
EP-78600-R024	Shift Supervisor Action – Request for Assistance for Radiation Incidents	WN	14.1
SOLID RADIOACTIVE WASTE MANAGEMENT FACILITY			
SI-01365-P102	Controlling Waste	WN	11.1 15.1
0087-79100-3010-001-SR-A	Safety Report – Solid Radioactive Waste Management Facility	PN	15.1
0087-79100-2001-001-GA-D-12	Operational Flowsheet – Solid Radioactive Waste Management Facility – Phase I	WN	15.1
0087-79100-2001-002-GA-D-15	Operational Flowsheet – Solid Radioactive Waste Management Facility – Phase II <i>(Shows the Phase II Extension)</i>	WN	15.1
87-79100-2001-003-GA-D-00	Operational Flowsheet – Solid Radioactive Waste Management Facility – Phase III	WN	15.1
NUCLEAR SUBSTANCES AND PRESCRIBED EQUIPMENT			
EXP-03400-0004	Radiation Protection Expectations and Directives	PN	7.1 16.1
LPA-00583-2022	Table 10: Nuclear Substances - Point Lepreau NGS – Application to renew the PLNGS Power Reactor Operating Licence	PN	16.1

CURRENT LICENCE



NUCLEAR POWER REACTOR OPERATING LICENCE

POINT LEPREAU NUCLEAR GENERATING STATION

- I) **LICENCE NUMBER:** **PROL 17.01/2022**
- II) **LICENSEE:** Pursuant to section 24 of the [Nuclear Safety and Control Act](#) this licence is issued to:
- New Brunswick Power Corporation**
515 King Street
Fredericton, New Brunswick
E3B 5G4
- III) **LICENCE PERIOD:** This licence is valid from July 1, 2017 to June 30, 2022, unless suspended, amended, revoked or replaced.
- IV) **LICENSED ACTIVITIES:**

This licence authorizes the licensee to:

- (i) operate the Point Lepreau Nuclear Generating Station (hereinafter “the nuclear facility”) and the Point Lepreau Solid Radioactive Waste Management Facility (hereinafter “the waste storage facility”) at a site located in Charlotte County and Saint John County, Province of New Brunswick;
 - (ii) possess, transfer, use, package, manage and store the nuclear substances, that are required for, associated with, or arise from the activities described in (i);
 - (iii) possess, transfer, import, use, package, manage and store the sealed and unsealed sources and the prescribed equipment;
 - (iv) transport Category II nuclear material by road vehicle from the nuclear facility spent fuel bay to the onsite waste storage facility; and
 - (v) possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i), (iii) and (iv).
- V) **EXPLANATORY NOTES:**
- (i) Nothing in this licence shall be construed to authorize non-compliance with any other applicable legal obligation or restriction.
 - (ii) Unless otherwise provided for in this licence, words and expressions used in this licence have the same meaning as in the [Nuclear Safety and Control Act](#) and associated Regulations.

- (iii) The [POINT LEPREAU NGS LICENCE CONDITIONS HANDBOOK \(LCH\)](#) provides compliance verification criteria used to verify compliance with the conditions in the licence. The LCH also provides information regarding delegation of authority, applicable versions of documents and nonmandatory guidance on how to achieve compliance.

VI) CONDITIONS:

G. **General**

G.1 The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:

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

unless otherwise approved in writing by the Canadian Nuclear Safety Commission (CNSC, hereinafter "the Commission").

G.2 The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.

G.3 The licensee shall control the use and occupation of any land within the exclusion zone.

G.4 The licensee shall provide, at the nuclear facility and at no expense to the Commission, suitable office space for employees of the Commission who customarily carry out their functions on the premises of that nuclear facility (onsite Commission staff).

G.5 The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission.

G.6 The licensee shall implement and maintain a public information and disclosure program.

1. **Management System**

1.1 The licensee shall implement and maintain a management system.

2. **Human Performance Management**

2.1 The licensee shall implement and maintain a human performance program.

2.2 The licensee shall implement and maintain the minimum shift complement and control room staffing for the nuclear facility.

2.3 The licensee shall implement and maintain training programs for workers.

2.4 The licensee shall implement and maintain certification programs in accordance with CNSC [Amended regulatory document [REGDOC-2.2.3, PERSONNEL CERTIFICATION, VOLUME III: CERTIFICATION OF PERSONS WORKING AT NUCLEAR POWER PLANTS](#), 2020-03]

Persons appointed to the following positions require certification:

- (i) Senior Health Physicist;
- (ii) Shift Supervisor; and
- (iii) Control Room Operator.

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3. Operating Performance

- 3.1 The licensee shall implement and maintain an operations program, which includes a set of operating limits.
- 3.2 The licensee shall not restart a reactor after a serious process failure without the prior written approval of the Commission, or prior written consent of a person authorized by the Commission.
- 3.3 The licensee shall notify and report in accordance with CNSC regulatory document [REGDOC-3.1.1 REPORTING REQUIREMENTS: NUCLEAR POWER PLANTS](#).
- 3.4 The licensee shall implement a periodic safety review in support of its subsequent power reactor operating licence application.

4. Safety Analysis

- 4.1 The licensee shall implement and maintain a safety analysis program.

5. Physical Design

- 5.1 The licensee shall implement and maintain a design program.
- 5.2 The licensee shall implement and maintain a pressure boundary program and have in place a formal agreement with an Authorized Inspection Agency.
- 5.3 The licensee shall implement and maintain an equipment and structure qualification program.

6. Fitness for Service

- 6.1 The licensee shall implement and maintain a fitness for service program.

7. Radiation Protection

- 7.1 The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

8. Conventional Health and Safety

- 8.1 The licensee shall implement and maintain a conventional health and safety program.

9. Environmental Protection

- 9.1 The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

10. Emergency Management and Fire Protection

- 10.1 The licensee shall implement and maintain an emergency preparedness program.
- 10.2 The licensee shall implement and maintain a fire protection program for the Nuclear Power Plant.

11. Waste Management

- 11.1 The licensee shall implement and maintain a waste management program.
- 11.2 The licensee shall implement and maintain a decommissioning strategy.

12. Security

- 12.1 The licensee shall implement and maintain a security program.

13. Safeguards and Non-Proliferation

- 13.1 The licensee shall implement and maintain a safeguards program.

14. Packaging and Transport

- 14.1 The licensee shall implement and maintain a packaging and transport program.

15. Solid Radioactive Waste Management Facility (SRWMF)

- 15.1 The licensee shall implement and maintain a waste management program for the Solid Radioactive Waste Management Facility (SRWMF).
- 15.2 The licensee shall obtain written approval of the Commission, or consent of a person authorized by the Commission prior to the start of operations at the Phase II Extension of the SRWMF.
- 15.3 The licensee shall implement and maintain a fire protection program for the SRWMF.
- 15.4 The licensee shall submit quarterly reports to the Commission on the activities at the SRWMF.

16. Nuclear Substances and Prescribed Equipment

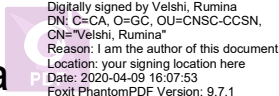
- 16.1 The licensee shall implement and maintain a program for nuclear substances and prescribed equipment.
- 16.2 The licensee shall not use nuclear substances in or on human beings.
- 16.3 The licensee shall not import or export the following items as described in the schedule, Parts A and B, to the Nuclear Non-proliferation Import and Export Control Regulations, subject to any restrictions or exemptions as noted in each paragraph of the schedule:
1. Special fissionable material, as described in paragraph A.1.1:
 - (i) Plutonium;
 - (ii) Uranium 233; and
 - (iii) Uranium enriched in Uranium 233 or Uranium 235.
 2. Source material, as described in paragraph A.1.2:
 - (i) Uranium, containing the mixture of isotopes that occurs in nature;
 - (ii) Uranium, depleted in the isotope Uranium 235; and (iii) Thorium.
 3. Deuterium and heavy water, as described in paragraph A.1.3.

4. Tritium, as described in paragraph A.1.5.
5. Alpha-emitting nuclear substances, as described in paragraph B.1.1.1, including but not limited to:
 - (i) Actinium 225, 227;
 - (ii) Californium 248, 250, 252, 253, 254;
 - (iii) Curium 240, 241, 242, 243, 244;
 - (iv) Einsteinium 252, 253, 254, 255;
 - (v) Fermium 257;
 - (vi) Gadolinium 148;
 - (vii) Mendelevium 258, 260;
 - (viii) Neptunium 235;
 - (ix) Polonium 208, 209, 210; and (x) Radium 223.
6. Radium-226, as described in paragraph B.1.1.16.

16.4 The licensee shall submit an annual compliance report to the Commission on the activities covering the nuclear substances or prescribed equipment.

SIGNED at OTTAWA April 9, 2020

**Velshi,
Rumina**

A purple rectangular stamp with a white 'P' in a circle on the left. To the right of the 'P' is the text: "Digitally signed by Velshi, Rumina", "DN: C=CA, O=GC, OU=CNSC-CCSN,", "GN=Velshi, Rumina", "Reason: I am the author of this document", "Location: your signing location here", "Date: 2020-04-09 16:07:53", "Foxit PhantomPDF Version: 9.7.1".

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Rumina Velshi
President
CANADIAN NUCLEAR SAFETY COMMISSION