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A Licence Renewal

Ontario Power Generation

Darlington Nuclear Generating Station

Commission Public Hearing – Part 2

Scheduled for:

24-26 June 2025

Submitted by:

CNSC Staff

Renouvellement d'un permis

Ontario Power Generation

Centrale nucléaire de Darlington

Audience publique de la Commission – Partie 2

Prévue pour :

24-26 juin 2025

Soumis par :

Le personnel de la CCSN

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Summary

This CMD presents information about the following matters of regulatory interest with respect to the Darlington Nuclear Generating Station:

- CNSC staff responses to topics of interest expressed by the Commission during Part 1 of the Darlington Nuclear Generating Station Licence Renewal Commission hearing, held on March 26, 2025, and through interventions submitted for Part 2 of the hearing.

CNSC staff recommend the Commission consider taking the following actions:

- Issue, pursuant to section 24 of the *Nuclear Safety and Control Act*, a Darlington NGS PROL authorizing OPG to carry out the activities listed in Part IV of the proposed licence from December 1, 2025 to November 30, 2055.

The following items are attached:

- Revised Power Reactor Operating Licence
- Revised Licence Conditions Handbook

Résumé

Le présent CMD fournit de l'information sur les questions d'ordre réglementaire suivantes concernant centrale nucléaire de Darlington:

- Réponses du personnel de la CCSN concernant des sujets d'intérêt exprimés par la Commission au cours de la partie 1 de l'audience sur le renouvellement du permis de la centrale nucléaire de Darlington, tenue le 26 mars 2025, et dans le cadre des interventions présentées pour la partie 2 de l'audience.

La Commission pourrait considérer prendre les mesures suivantes :

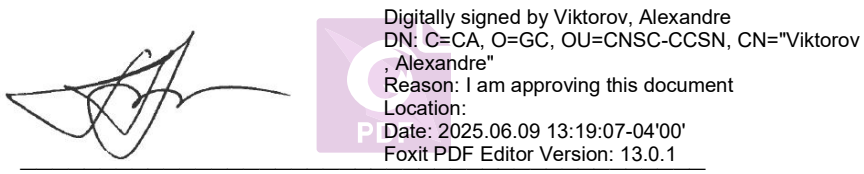
- Délivrer, conformément à l'article 24 de la *Loi sur la sûreté et la réglementation nucléaires*, un PERP pour la centrale de Darlington autorisant OPG à exercer les activités énumérées à la Partie IV du permis proposé, du 1er décembre 2025 au 30 novembre 2055.

Les pièces suivantes sont jointes :

- Licence d'exploitation révisée pour réacteur nucléaire
- Manuel des conditions de permis révisé

Signed/Signé le

09 June 2025 / 09 juin 2025



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Director General

Directorate of Power Reactor Regulation

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Land Acknowledgement

The Darlington site is located on the north shore of Lake Ontario in Clarington, Ontario, 5 kilometers outside the town of Bowmanville and 10 kilometers southeast of Oshawa. The Darlington site resides on lands in which many Indigenous Nations and communities have a vested interest and rights, lying within the lands and waters of the Michi Saagiig Anishinaabeg, the Gunshot Treaty (1877-88), the Williams Treaties (1923), and the Williams Treaties Settlement Agreement (2018).

Plain Language Summary

CMD 25-H2.C is a supplemental CMD to CMD 25-H2. This CMD provides CNSC staff responses to topics of interest expressed by the Commission during Part 1 of the Darlington Nuclear Generating Station Licence Renewal Commission hearing, held March 26, 2025, as well as additional information for themes identified during review of interventions received for Part 2 of the Darlington Nuclear Generating Station Licence Renewal Commission hearing.

Referenced documents in the CMD are available to the public upon request, subject to confidentiality considerations.

CMD STRUCTURE

This Commission Member Document (CMD) is presented in 2 parts.

Part 1 of this CMD includes:

1. an overview of the matter being presented;
2. historical perspective on licence periods and their evolution;
3. engagement and outreach;
4. discussion about matters of interest raised by the Commission and intervenors; and
5. overall conclusions and recommendations

Part 2 of this CMD provides a revised version of the Power Reactor Operating Licence and the Licence Conditions Handbook that was included in the Part 1 CMD.

1. Overview

1.1 Background

The Panel of the Commission is considering the request from Ontario Power Generation (OPG) to renew the Power Reactor Operating Licence (PROL) for the Darlington Nuclear Generating Station (NGS). Part 1of the Commission hearing was held on March 26, 2025.

OPG's current operating licence expires on November 30, 2025 [1]. OPG submitted an application to renew the PROL for the Darlington NGS for 30 years.

In the Commission Proceedings Transcript for the Part 1 hearing, the Commission identified a topic of interest to be considered during the Part 2 Commission hearing. CNSC staff have provided information on the topic of interest in this supplemental CMD, along with responses to interventions received by the deadline set by the Commission registry.

1.2 Overall Conclusions

Having considered interventions received for Part 2 of the Darlington NGS Licence Renewal Commission hearing, CNSC staff's conclusion and recommendations remain unchanged following Part 1 of the Commission hearing, as found in CMD 25-H2.

1.3 Overall Recommendations

CNSC staff provide the following recommendation regarding the duration of the licence period:

- Accept OPG's proposed licence length of 30 years.
- Introduce a new licence condition for OPG to conduct ongoing Indigenous engagement activities.

The new licence condition is a notable change of the licensing basis to ensure that OPG will continue engagement with Indigenous Nations and communities throughout the licence period. In particular, CNSC staff support OPG's proposal, developed in consultation with Indigenous Nations and communities, for decennial reviews during the licence period.

CNSC staff recommend the following:

1. **Conclude,** pursuant to paragraphs 24(4)(a) and (b) of the *Nuclear Safety and Control Act* **(NSCA) in that the licensee/applicant:**

    a) **Is qualified** to carry on the activities authorized by the licence

    b) **Will make adequate provision** for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

2. **Renew** the Darlington NGS PROL authorizing OPG to carry out the licenced activities listed in part IV of the proposed licence
3. **Delegate** the authority to the CNSC staff as set out in section 5.6 of CMD 25-H2

2. Licence Periods

According to the Darlington NGS licence renewal Part 1 Commission hearing proceeding transcript, the Commission expressed interest in receiving further rationale for a 30-year licence period.

The following sections will provide information regarding long-term operations and the duration of the licence period.

2.1 Historic Perspective

The original Atomic Energy and Control Board (AECB) standard licences were issued to major facilities including nuclear power plants (NPPs), large fuel cycle facilities and uranium mines and mills for short duration, typically two years. Between the 1970s to the 1990s there were limited public hearings and licence amendments were handled by CNSC staff.

At the time, some questions related to the design, construction and initial operation of the NPPs remained open, shorter licences were considered appropriate to allow for follow-up on these topics.

During the timeframe of 1970-2000, the Canadian nuclear sector gained significant operating experience from the commercial operation of nuclear facilities, including NPPs, both domestically and internationally. Many safety matters were examined in depth and brought to satisfactory resolution. The regulatory requirements and operating practices evolved and matured to result in strong management systems, healthy safety culture, preparedness for severe accidents, systematic maintenance, environmental qualification, configuration management and an integrated view of safety.

At the same time, the AECB began increasing public engagement in hearings. This process intensified in the 1990's, leading to the foundation of the robust public engagement mechanisms that are in place today.

2.2 Recommending Licence Periods to the Commission

The *Nuclear Safety and Control Act* (NSCA) came into force in 2000 and outlined the roles and responsibilities of CNSC staff and the Commission. As a result of the change, there was an increase in the number of items that required Commission decision.

In 2002, CNSC staff presented to the Commission a new approach for recommending licence periods based on benchmarking with international practices, as outlined in CMD 02-M12.A [2].

International benchmarking, as elaborated on in CMD 25-H2, showed that licences in many countries are issued either for the life of the nuclear facility or range from 10 to 40 years. Countries with longer licence periods in many cases included the requirement to complete periodic safety reviews (PSR). These periodic assessments have not indicated any erosion of safety performance with longer licence periods.

CNSC staff's approach for recommending licence periods to the Commission included several elements. According to CMD 02-M12.A, CNSC staff's recommendation for a 5-year licence was based on the following:

- establishing standardized criteria across all licence types
- using a risk-informed approach based on facility type and licensed activity
- applying a comprehensive approach to compliance
- implementing regular reporting to the Commission

Specifically for the Darlington NGS the Atomic Energy Control Board issued a series of 2-year licences to operate. Table 1 lists the licences issued by CNSC.

Table 1: CNSC issued licences to operate for the Darlington NGS

Licence Number	Effective Dates

PROL 13.00/2003	Dec 1, 2000 – Feb 28, 2003
PROL 13.00/2008	Mar 1, 2003 – Feb 29, 2008
PROL 13.00/2013	Mar 1, 2008 – Feb 28, 2013
PROL 13.00/2014	Mar 1, 2013 – Dec 31, 2014*
PROL 13.00/2025	Jan 1, 2016 – Nov 30, 2025

* later extended by the Commission due to timing and scheduling to Dec 31, 2015

Following a period of licences that were issued for 5 years, licensees requested, and CNSC staff recommended the implementation of 10-year licences. This recommendation was based on:

- meeting all the requirements of a 5-year licence
- conducting an Integrated Safety Review/Periodic Safety Review for NPPs

The approach proposed in CMD 02-M12, allowed the CNSC to be more closely aligned with international licensing practices. In 2015, the Commission granted the Darlington NGS a 10-year licence; and subsequently to many other licensees, accepting the recommendations outlined in CMD 02-M12.

2.3 Progress and Evolution Since CMD 02-M12.A

Since the implementation of 10-year licences, CNSC staff have continued to invest in maintaining a strong regulatory framework. This includes the publication of several new and updated regulatory documents that set clear regulatory requirements for the safe operation of NPPs, enhancements in compliance oversight, improvements to public engagement and additional requirements.

CNSC staff have further strengthened compliance oversight, including:

- Implementation of a risk-informed 5-year baseline inspection plan, that incorporated significant improvements, as outlined in the Office of the Auditor General corrective action plan,
- Development of inspection guides/procedures, for all Safety and Control Areas,
- Systematic capturing of lessons learned from regulatory oversight, allowing for continuous improvement,
- New and improved reporting requirements through REGDOC-3.1.1, Reporting Requirements for Nuclear Power Plants, version 3, including safety performance indicators that are reviewed and evaluated by CNSC staff to assess the overall health of a Safety and Control Area, and event reporting for situations or events of higher safety significance.

- Integrated assessment of various inputs from oversight activities to assess overall performance and prioritize further regulatory oversight.
- Activities by CNSC staff to promote licensees understanding and compliance with regulatory requirements

The suite of enforcement tools has been enhanced by introducing additional enforcement options, such as notices of non-compliance and Administrative Monetary Penalties.

There have also been significant strides in strengthening regulatory reporting, for example the regular reporting through the Power Reactor Status Report at each Commission meeting and Regulatory Oversight Report (ROR), where the performance of each of the NPPs is assessed and presented to the Commission.

CNSC staff conduct environmental protection reviews (EPRs) for all licence applications with potential environmental interactions, in accordance with the CNSC's 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. CNSC staff document the results in an environmental protection review report (EPRR) and is an example of a new initiative of enhanced regulatory communication.

NPP licensees are also required to submit several assessments on a 5-year frequency, such as:

- An environmental risk assessment, in accordance with REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.2,
- A probabilistic safety assessment, in accordance with REGDOC-2.4.2, Probabilistic Safety Assessment (PSA) for Reactor Facilities,
- A preliminary decommissioning plan, in accordance with REGDOC-2.11.2, Decommissioning

CNSC staff have continued the trust building activities. Specifically, at the Darlington NGS, CNSC staff engage in routine meetings with representatives of Indigenous Nations and Communities and with members of the public. To achieve meaningful engagement, CNSC staff continuously adjust the topics for discussion and the type of information shared based on the current interests and continuously seek feedback on the frequency of the meetings and the quality of the engagement. This topic is covered in detail in CMD 25-H2 and in Section 3.1 of this supplemental CMD.

3. Engagement

CNSC staff continually engage with members of Indigenous Nations, communities and representative organizations, the public, and interested parties about regulated facilities, including the Darlington NGS. CNSC staff's current engagement strategy focuses on providing opportunities for open dialogue regarding specific areas of interest and/or concern, the CNSC mandate to disseminate scientific information about the nuclear industry, and to provide updates regarding the regulatory oversight of the facility.

CNSC staff seek to tailor Indigenous and public engagement to the interests of the audience. Engagement is not limited nor bound to a licensing period. The engagement with Indigenous Nations, communities and representative organizations, and the public is a continuum regardless of the duration of the licence period.

3.1 CNSC Staff – Engagement with Indigenous Nations and Communities

3.1.1 Introduction

This supplemental CMD provides an update on CNSC staff's efforts with regards to engagement activities with Indigenous Nations and communities on OPG's application for the renewal of the Darlington NGS Power Reactor Operating Licence (PROL). Information included in this report should be considered in addition to the information in CNSC staff's CMD 25-H2.

3.1.2 Update on CNSC Staff's Engagement Efforts

Since February 2025, CNSC staff have continued to make efforts to engage, collaborate, address questions and concerns and share information with all identified Indigenous Nations and communities (as listed in CMD 25-H2). CNSC staff aimed to have a flexible and customized approach to engagement, being mindful of each Indigenous Nation and communities' specific rights, interests, needs, and requests. CNSC staff engaged through written correspondence, as well as by organizing workshops and meetings with leadership and community representatives.

CNSC staff's goal with engagement efforts leading up to the Part 2 hearing was to strive to achieve a shared understanding of the key issues and concerns raised by the Indigenous Nations and find ways to meaningfully address them. In addition, the CNSC worked with the four Michi Saagiig Nations of the Williams Treaties First Nations (AFN, CLFN, HFN and MSIFN) to support continued engagement and participation in the Darlington NGS licence renewal review process including the Commission hearing. To this purpose, additional funding of $212,995 in total was provided to the four Nations.

Since February 2025, CNSC staff continue to meet monthly with Curve Lake First Nation (CLFN), Hiawatha First Nation (HFN), Mississaugas of Scugog Island First Nation (MSIFN), Saugeen Ojibway Nation (SON) and Métis Nation

of Ontario (MNO) which include ongoing discussions on OPG's Darlington NGS licence renewal application.

CNSC staff held focused discussions and meetings with CLFN, HFN, MSIFN, and SON to specifically discuss the proposed Indigenous engagement licence condition (LC) and draft compliance verification criteria (CVC) related to LC G.7. The monthly meetings on March 20 (CLFN), March 28 (MSIFN), and April 7 (HFN) included agenda items dedicated to the proposed LC and draft CVC for the Darlington NGS. Two meetings with all four Michi Saagiig Nations were also held to further discuss the licence renewal application and the proposed LC on April 11 and May 15, 2025. CNSC staff and the Michi Saagiig Nations and SON continue to discuss the draft CVC to work towards agreement on the proposed language.

In addition to monthly meetings, engagement with SON included a leadership meeting on May 7, 2025, during which several ongoing projects were discussed, including OPG's licence renewal application. This meeting provided an opportunity to share updates, hear perspectives, and identify areas requiring further dialogue. A follow-up meeting was held May 12, 2025, with SON and CNSC staff to focus specifically on the proposed LC and solicit SON's feedback on the draft CVC. CNSC staff and SON continue to discuss the draft CVC and work towards agreement on the language in relation to the SON's specific concerns regarding waste management and transfers to the Western Waste Management Facility.

To date, MNO has not raised concerns in monthly meetings with CNSC staff in relation to OPG's licence renewal application. In an e-mail to CNSC staff on October 7, 2024, MNO communicated that there is "likely not sufficient interest in pursuing the project". CNSC staff continue to share key details and updates with MNO, ensuring they have relevant information should it become of interest.

CNSC staff followed up via e-mail on May 1, 2025, with all other identified Indigenous Nations and communities with whom regular recurring meetings are not currently established. The e-mail provided an update on the project, upcoming deadlines and hearing dates, and invited questions or the opportunity to meet for further discussion.

These Nations included:

- Chippewas of Beausoleil First Nation
- Georgina Island First Nation
- Chippewas of Rama First Nation
- Mohawks of the Bay of Quinte
- Six Nations of the Grand River
- Mississaugas of the Credit First Nation

Of these, only Six Nations of the Grand River responded to the outreach and communications.

Section 3.1.3 provides further details on the meetings and discussions held to date, the key concerns raised by Nations, and how CNSC staff have responded and plan to continue working collaboratively toward solutions and options to address the concerns and requests raised to date.

3.1.3 Key Concerns Raised by Indigenous Nations and Communities

The following sections summarizes key concerns raised by Indigenous Nations and communities during CNSC staff's engagement from February to May 2025.

CNSC staff have taken steps respond to and address these concerns by engaging in dialogue, incorporating Indigenous perspectives into CNSC documentation, relaying concerns to OPG, and offering opportunities to meet and collaboratively explore solutions. CNSC staff remain committed to working with Indigenous Nations and communities to find effective, consensus-based approaches to addressing key issues.

CNSC staff acknowledge that efforts to resolve concerns are based on the information received to date and recognize that the upcoming public hearing provides an important opportunity for Indigenous Nations and communities to express their views directly to the Commission. The hearing process forms a vital part of the CNSC's overall engagement and consultation approach; the Commission carefully considers all oral and written submissions from Indigenous Nations and communities, alongside submissions from CNSC staff and OPG.

3.1.3.1 Concerns Related to CNSC's Policies, Processes and Practices

Concerns with CNSC's Implementation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

CNSC staff are aware that some Indigenous Nations and communities have concerns regarding the CNSC's approach to implementing UNDRIP through the United Nations Declaration on the Rights of Indigenous Peoples Act (UNDA) and Free, Prior and Informed Consent (FPIC). The CNSC has taken steps to address these concerns including responding to requests for clarity on how CNSC is implementing UNDRIP, asking for feedback on how to improve CNSC processes, and organizing policy discussions with Indigenous Nations and communities, Natural Resources Canada (NRCan), and Justice Canada to discuss alignment of consultation practices with UNDA principles and the Government of Canada's implementation of UNDA, the action plan and the principles of UNDRIP including FPIC.

The CNSC's approach to engagement and consultation is guided by the principles of UNDRIP and is consistent with the whole of government approach by:

- **Building long-term relationships** by conducting outreach and engagement activities on a regular basis, outside of a formal regulatory process, to help to build relationships and trust.
- **Providing meaningful opportunities to participate** in CNSC processes, such as collaborating on reports, reviewing licensee or proponent documents,

offering opportunities to participate in Commission proceedings and discussing issues and concerns with an aim to come to a consensus.
- **Incorporating and reflecting Indigenous Knowledge** into the CNSC's regulatory processes as per the CNSC's Indigenous Knowledge Policy Framework.
- **Reducing financial and capacity barriers** to participate in CNSC processes through the CNSC's Participant Funding Program and Indigenous and Stakeholder Capacity Fund.
- **Updating regulatory documents**, such as REGDOC-3.2.2, which is currently under revision, to ensure clear, consistent and meaningful Indigenous engagement programs, that are aligned with the principles of UNDRIP, across the nuclear industry.
- **Increasing cultural competency** by providing CNSC Staff with training opportunities regarding diversity, inclusion and Indigenous reconciliation.
- **Working with Indigenous Nations and communities** to understand, support and respect their governance processes for coming to their FPIC position in relation to proposed nuclear projects that may impact their rights and interests.

CNSC staff acknowledge that this is a work in progress and are committed to continuing to evolve our approaches to align with best practices, policies and legal requirements regarding consultation, engagement and UNDRIP. The CNSC is currently organizing policy discussions with Indigenous Nations and communities, which will take place throughout 2025, to discuss a range of topics, including:

- CNSC consultation and engagement practices and policies
- Implementing the UNDRIP and FPIC
- The CNSC's regulatory framework
- CNSC's funding programs
- Registry and Commission processes (e.g., Commission proceedings, Commission Member Document development, and Indigenous participation)

The discussions will result in a What We Heard Report that the CNSC will use to update our processes and guide potential changes and updates to the CNSC's practices, policies and framework. Additionally, the CNSC will develop a set of Guiding Principles for how the CNSC works with Indigenous Nations and communities. The CNSC is committed to finding solutions on how we can improve and enhance our framework for consultation, engagement and UNDRIP implementation.

Furthermore, CNSC's REGDOC-3.2.2 *Indigenous Engagement* is being renewed and updated. This update will provide nuclear proponents and licensees with further guidance and clarity on how they should approach engagement and partnership with Indigenous Nations and communities. The UNDRIP, UNDA and the UNDA Action Plan will be referenced and reflected in the updated version of REGDOC 3.2.2. Section 4.2.4 of the What We Heard Report outlines the CNSC's

intentions of supporting the implementation of UNDA. The CNSC has been working with Indigenous Nations and communities to incorporate feedback received to date into an initial draft. The CNSC has provided funding through its Capacity Fund to assist in the review and submission of comments on REGDOC-3.2.2 during the formal consultation period, which is expected to occur in Summer 2025.

The CNSC remains committed to meaningful and ongoing engagement with Indigenous Nations and communities as part of its reconciliation efforts. Through continued dialogue, collaboration, and responsiveness to feedback, the CNSC aims to strengthen relationships, improve our consultation and engagement practices, and support the implementation of UNDRIP.

Lack of opportunity for Indigenous Nations and communities to participate in or to speak at the Part I Commission Hearing as government entities and organizations are invited to do so

Leading up to the Part 1 hearing on March 26, 2025, CNSC staff heard from the Michi Saagiig Nations that their preference was for Indigenous consultation and engagement content to be presented only when they would be present and participating. In response, and out of respect for this request, CNSC staff did not present or discuss Indigenous engagement matters during Part 1 of the hearing. Instead, CNSC staff committed to addressing these topics during Part 2 of the hearing, when the Michi Saagiig Nations will be present and participating through their interventions.

To support meaningful participation, CNSC staff offered Indigenous Nations and communities the opportunity to review and provide input on CNSC's presentation slides for Part 2. At the time of this report's preparation, staff had shared the presentation slides with the Michi Saagiig Nations and the SON and are awaiting their review and feedback. Additionally, CNSC staff worked collaboratively with Indigenous Nations to incorporate ceremonial elements into the hearing proceedings, including an opening and closing ceremony, to reflect Indigenous protocols and create a more inclusive and respectful environment.

Moving forward, CNSC staff remain committed to working with Indigenous Nations and communities to identify constructive, culturally appropriate, and respectful ways to support their involvement in the Commission hearing process.

3.1.3.2 Concerns Related to the Darlington NGS licence renewal

Concerns on the 30-year licence, specifically on how OPG plans to engage with Indigenous Nations within a 30-year licence term

CNSC staff also heard concerns from the Michi Saagiig Nations and SON regarding the proposed length of the licence, specifically on holding OPG accountable to continue to engage with and involve Indigenous Nations and communities within a 30-year licence term. In response to this, CNSC staff are proposing Licence Condition (LC) G.7, which would require OPG to conduct

ongoing Indigenous engagement and report on their specific commitments to Nations in relation to the ongoing operations of the Darlington NGS.

CNSC staff shared the proposed LC and draft LCH with AFN, CLFN, HFN and MSIFN on February 28, 2025, and requested feedback on the proposed licence condition. The proposed LC and draft CVC were discussed individually with CLFN, HFN and MSIFN during meetings on March 20, April 7 and March 28, respectively.

The proposed LC and draft CVC text were discussed in a meeting with all of the Michi Saagiig Nations of the Williams Treaties First Nations on April 11, 2025. CNSC staff encouraged the Nations to share feedback to help ensure the proposed LC and LCH CVC includes language that reflects their concerns and priorities for ongoing engagement and reporting during the licensing term.

During the meeting, CNSC staff gathered the following feedback from the Michi Saagiig Nations on the draft CVC language:

- Emphasize the need for more operational knowledge, participation in environmental monitoring, and incident reporting.
- Ensure OPG's engagement plan is co-developed and endorsed by Nations, with clear standards to ensure compliance.
- Require OPG to demonstrate how Indigenous input is incorporated into decision-making and clarify consequences if commitments are not met.
- Establish mechanisms for Nations to provide input on reports and key documents.
- Strengthen wording in CVC requirements to emphasize implementation of Indigenous input, not just identification.
- Clarify the process for disagreements when CNSC is satisfied with OPG's performance, but Nations are not.

CNSC staff worked to incorporate the feedback received into the draft CVC and sent a revised draft to the Michi Saagiig Nations on April 24, 2025, for their review and comment.

During the time of this report's development, CNSC staff and the Michi Saagiig Nations plan to discuss the revised CVC during a meeting on May 15, 2025.

The proposed LC and draft CVC were discussed in a meeting with SON on May 12, 2025. During the meeting, SON provided an update on the ongoing initiatives between OPG and SON to formalize a process for FPIC regarding waste management in their territory. They also requested that CNSC staff explore a regulatory mechanism to trigger a review of the Darlington NGS waste management plan when the Western Waste Management Facility is up for relicensing in 2027. CNSC staff are working to incorporate this feedback into the draft CVC for Darlington NGS, in collaboration with SON, and are proposing an additional line item to recognize and request updates on the ongoing discussions between OPG and SON about waste management in SON territory.

In Part 2 of this CMD, CNSC staff have included the updated CVC text for the proposed LC G.7, which has incorporated feedback received to date from the Michi Saagiig Nations and SON. CNSC staff are committed to continue to work on reaching consensus on the language of the CVC so that it reflects the needs and priorities of the Indigenous Nations and communities.

Concerns on the 30-year licence, specifically on the lack of ability to voice concerns and exercise self-determination in relation to the project

CNSC staff heard concerns from the Michi Saagiig Nations on the length of the requested licence period, including the lack of ability to voice concerns and exercise self-determination in relation to the Darlington NGS.

Should the licence be issued, the CNSC is committed to working to address any issues and concerns as they arise throughout the life cycle of the Darlington NGS, through the CNSC's ongoing oversight and engagement. Avenues to bring forth concerns include through the existing relationships with the CNSC and the proponent, and through Commission proceedings, such as annual reporting. CNSC staff are supportive of the recommendation put forward by OPG, following their discussions with the Nations, for decennial reviews throughout the 30-year licence period, where Indigenous Nations and Communities and the public would have the opportunity to be heard before the Commission in relation to the Darlington NGS. CNSC staff also highlighted in discussion with the Nations, the ability to raise concerns at any time directly to the Commission in written communications. CNSC staff remain committed to collaborating with Indigenous Nations and communities to address their concerns and will continue to provide updates on the Darlington NGS through regular meetings under existing and future Terms of References for long-term engagement between CNSC and the Nations.

Outstanding concerns on Darlington NGS waste management at the Western Waste Management Facility (WWMF)

The SON has expressed concerns regarding OPG's request for a 30-year license renewal for Darlington. Their primary concern is the continued shipment of low and intermediate level waste from Darlington to the WWMF, in SON territory, for storage, which SON view as a continuation of legacy issues dating back to the 1960s. SON expressed concern that extending the license will perpetuate these issues for another 30 years without addressing their concerns about waste management in their territory. SON highlighted the need to address the history and legacy of waste storage in their territory, in addition to pursuing an FPIC process with OPG for incoming wastes. The SON requested that the CNSC recognize this work within the ongoing monitoring and oversight of Darlington NGS.

CNSC staff committed to supporting OPG's and SON's efforts to collaboratively explore solutions to this concern. OPG will be expected to communicate openly and consistently with SON about waste management practices and continue to participate in discussions to address legacy issues. This collaborative approach is

intended to ensure that SON's concerns are acknowledged and meaningfully addressed.

As noted above, CNSC staff have incorporated changes into the draft CVC of the proposed LC G.7 to reflect OPG's initiatives with SON and request a status update on these items and discussions.

Scoping of Rights-Bearing and Interested Indigenous Nations and Communities in Relation to the Darlington NGS

The Six Nations of the Grand River (SNGR) have expressed concerns regarding how they have been scoped for engagement in the Darlington area. They feel that their rights are not being acknowledged, leading to dissatisfaction with the engagement process. SNGR asserts that they are a rights-bearing Nation and have provided CNSC staff with information supporting their claims.

SNGR indicated that the Haudenosaunee believe they've signed a treaty over the lands. They also raised concerns about how a potential nuclear emergency would impact their territory.

In response to SNGR's concerns, CNSC staff meet with SNGR to discuss the issues further and explore ways to improve the CNSC's engagement approach. Additionally, staff reached out to Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) for clarification on CIRNAC's position regarding SNGR's assertions. Although impacts to rights or the duty to consult are not expected to arise from this licence renewal application, CNSC staff believe SNGR has been given all possible opportunities to engage and participate in this renewal application process and provide information about their specific concerns and how the renewal may impact their rights and interests. CNSC staff are committed to working with SNGR on a path forward that addresses SNGR's perspectives and ensures meaningful engagement.

3.1.4 OPG's Indigenous Engagement

As noted in CNSC staff's CMD 25-H2, based on the information in OPG's application, the licence renewal is unlikely to cause new adverse impacts to the exercise of potential or established Indigenous and/or Treaty rights as the licence renewal will not change the Darlington NGS site characterization, authorize new activities or result in the construction of new facilities at the site. As it is unlikely that the licence renewal could cause new adverse impacts on Indigenous and/or Treaty rights, the requirements in REGDOC-3.2.2: *Indigenous Engagement* do not apply.

However, OPG has conducted engagement and communication activities with all identified Indigenous Nations in relation to their Darlington NGS licence renewal application, and CNSC staff are satisfied with OPG's engagement activities to date and encourage OPG to continue working with Indigenous Nations and communities through ongoing engagement, including discussing issues and concerns raised and working collaboratively to address them.

CNSC staff note that through proposed LC G.7, OPG will be required to continue to engage with Indigenous Nations and communities and report to the CNSC annually on that engagement throughout the licence period, should the Commission grant a licence. In the proposed LC's draft CVC, CNSC staff require OPG to collaboratively develop an Indigenous Engagement Program and an approach to engagement that meets the needs of all parties.

CNSC staff note that, in OPG's application, they have made a number of specific commitments to address the concerns, comments and requests from the Michi Saagiig Nations. Through LC G.7, CNSC staff will continue to monitor OPG's engagement activities and implementation of those commitments, should the Commission renew the licence to operate.

On March 17, 2025, OPG submitted a letter to the CNSC stating their support for decennial reviews throughout the 30-year licence term, where Indigenous Nations and communities and the public will have the opportunity to be heard before the Commission. CNSC staff are supportive of this approach.

CNSC staff are committed to working collaboratively with Indigenous Nations and communities on regulatory oversight and follow-up activities related to their concerns and OPG's commitments including monitoring and reporting activities, to ensure their rights and interests are protected.

3.1.5 Conclusion

Throughout this application and regulatory review process, CNSC staff and OPG have engaged with Indigenous Nations and communities to ensure they had the opportunity to raise concerns, provide input, and participate meaningfully in the regulatory review process, including the Commission hearing. In response to the issues raised, the CNSC and OPG have worked to identify potential solutions and develop commitments aimed at addressing these concerns and working towards consensus.

CNSC staff are proposing LC G.7, which would require OPG to continue engaging with Indigenous Nations throughout the licensing period and to uphold the commitments outlined in its application. This LC would allow ongoing oversight and accountability regarding OPG's engagement efforts. CNSC staff are committed to continue to work on reaching consensus on the language of the CVC so that it reflects the needs and priorities of the Indigenous Nations and communities.

Mechanisms are in place to ensure that Indigenous and treaty rights are respected and that concerns continue to be heard and addressed. These include ongoing relationships and engagement with CNSC staff, engagement in relation to annual reporting, review of compliance and environmental protection reporting, involvement in the CNSC's Independent Environmental Monitoring Program, and the opportunity to intervene in Commission proceedings. Furthermore, CNSC staff are supportive of the recommendation put forth by OPG, following discussions with Indigenous Nations and communities for decennial reviews throughout the 30-year licence term.

Based on engagement to date, CNSC staff have not identified concerns regarding potential new impacts on Indigenous and/or treaty rights related to this licence renewal application. However, staff acknowledge that Indigenous Nations and communities may choose to inform the Commission of their views directly through their interventions.

CNSC staff remain committed to ongoing engagement, relationship-building, and collaboration with all identified Indigenous Nations and communities with an interest in the Darlington site and its continued operation.

3.2 CNSC Staff – Public Engagement

The CNSC continues to actively promote ongoing communication and dissemination of regulatory and scientific information through social media channels, webinars, mail-outs, outreach in the local communities and postings on the CNSC web site. The CNSC offers assistance to interested members of the public and Indigenous Nations and communities through the PFP, to prepare for and participate in the Commission's hearing process. This funding is available for all Commission meetings and hearings, including for the annual Regulatory Oversight Reports and will assist in ensuring that Indigenous Nations and communities and members of the public are able to fully engage with the Commission over the proposed licensing period.

Section 3.2.1 provides information on additional funding awarded since CNSC staff's CMD 25-H2 was published in February 2025.

3.2.1 Participant Funding Program

As noted in CMD 25-H2, the CNSC awarded $143,719.05 to 8 recipients through its PFP to support participation in the Commission hearing. In addition, the CNSC awarded $212,995.55 to the 4 Michi Saagiig Nations for additional meetings and activities in relation to the Darlington licence renewal and associated licence condition handbook.

Table 2: Participant Funding

Applicant	Maximum amount of available funding
Curve Lake First Nation	$96,748.52
Hiawatha First Nation	$47,980.07
Alderville First Nation	$33,637.50
Mississaugas of Scugog Island First Nation	$34,629.46
Total	**$212,995.55**

3.2.2 Conclusion

CNSC staff continue to inform Indigenous Nations and communities and the public 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 Darlington NGS.

CNSC staff encourage the public and Indigenous communities to participate in Commission proceedings and provide PFP to support participation.

3.3 Commission Engagement

OPG's request for a longer-term PROL has led to Indigenous Nations and communities and representative organizations, members of the public, and other interested parties expressing concern that they may lose the opportunity to voice their opinions directly to the Commission if licence periods are extended too far into the future.

In addition to a licence hearing, there are several other types of commission proceedings including licence amendments, regulatory oversight reports, status updates on power reactors, event initial reports, deviations from the licensing basis, specific Commission requests and reviews of AMPs. Many of these proceedings currently provide opportunities for Indigenous Nations, communities and representative organizations, members of the public, and interested parties to engage with the Commission through the intervention process. The Commission can adjust the level of engagement in Commission Proceedings at their discretion.

The Commission, irrespective of the duration of any licence can amend, suspend in whole or in part, or revoke a licence at any time, on its own initiative, should it not be satisfied with a licensee's performance. CNSC staff will continue to inform the Commission on licensee performance as outlined in the following sections.

3.3.1 Routine Reporting to the Commission

Status Report on Power Reactors

CNSC staff update the Commission on the status of NPPs in Canada through the Status Report on Power Reactors at every Commission Meeting. The CMD includes information on operations, licensing, event notifications, station updates, updates on any previous Commission actions, and any other relevant information.

Regulatory Oversight Reports for Nuclear Power Generating Sites

CNSC staff summarize the outcomes of regulatory oversight and highlights of the safety performance of Canadian NPPs, and their associated waste management facilities in the annual Regulatory Oversight Report (ROR) for Nuclear Power Generating Sites (NPGS). Currently, the NPGS ROR is presented to the Commission on an annual basis and provides CNSC staff with the opportunity to report on annual licensee performance. The ROR process includes written interventions from members of the public and Indigenous Nations and communities. In addition, Indigenous intervenors can request to present orally. Participant funding is available to support interventions.

3.3.2 Non-Routine Reporting to the Commission

Licence Amendments

Amendments to the current licence that don't take place during a licensing/relicensing hearing (which are also forums for reporting to the Commission), must come before the Commission for decision.

Within the current licence period, there have been several licence amendments that have been part of a Commission hearing which involved public interventions:

1. CMD 25-H100 Amendment to the Darlington Nuclear Generating Station Power Reactor Operating Licence (PROL) for the production of Additional Isotopes using the Target Delivery System
2. CMD 24-H101 Amendment of the power reactor operating licence (PROL) for the production of cobalt-60 (Co-60) radionuclide at the Darlington Nuclear Generating Station (NGS)
3. CMD 21-H107 Amendment of the power reactor operating licence (PROL) for the production of molybdenum-99 (Mo-99) radioisotope at the Darlington Nuclear Generating Station (NGS)
4. CMD 17-H109 Amendment of the power reactor operating licence (PROL) for the authorize OPG to import and export nuclear substances that consist primarily of contaminated laundry

Event Initial Reports

CNSC staff's event initial reports (EIR) inform the Commission of potential issues, including those that require a Commission decision. This reporting mechanism provides notification of significant events to the Commission and informs on the situation, the impact, and the status of controls in place to assure safety and security.

There were three non-security related EIRs for the Darlington NGS over the licensing period:

- 2017-02-10 Contaminated motors shipped to unlicensed vendor [3]
- 2018-02-06 Retube waste processing building – internal contamination event [4]
- 2024-06-03 Potential neutron exposure of workers [5]

Deviations from the Licensing Basis

The licensing basis sets the boundary conditions for a regulated activity and is defined as a set of requirements and documents for a regulated activity comprising the following:

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

All licensees are required to conduct their activities in accordance with the licensing basis. Requests for deviations from the licensing basis are to be brought to the Commission for decision. There were no requests for the Darlington NGS in this category to report.

Review of Orders

Under the Nuclear Safety and Control Act a CNSC inspector or a CNSC designated officer can order a licensee to take measures to ensure that the environment, health, safety and security of persons are protected or to ensure that Canada's international obligations are complied with. REGDOC-3.5.2, Compliance and Enforcement, Volume II: Orders Under the Nuclear Safety and Control Act describes the processes surrounding making, receiving, reviewing, appealing and redetermining orders under the NSCA. If such an order is issued, within 10 days of making an order, the inspector or designated officer will refer the order to the Commission for review. The process allows the person(s) subject to the order an opportunity to be heard and present information for consideration.

OPG was issued an order requiring Commission authorization prior to the restart of Units 1 and 4, following any outage that results in the cooldown of the heat transport system. This order was issued following discovery of elevated hydrogen equivalent concentrations at the Bruce NGS.

Appeal of Administrative Monetary Penalties

An administrative monetary penalty (AMP) is a monetary penalty imposed by the CNSC, without court involvement, for the violation of a regulatory requirement. An AMP can be applied against any individual or corporation subject to the NSCA. Under section 65.1 of the NSCA an AMP can be reviewed, upon request by the recipient, by submitting a request for review to the Commission within 30 days of receiving the notice of violation. One AMP was issued to OPG for the Darlington and Pickering NGS's for a security issue in 2023 and another was issued to New Brunswick Power for the Point Lepreau station in 2025 related to hours of work violations.

3.3.3 Potential Additional Reporting to the Commission

The Commission has the authority to call public proceedings on any matter of interest to the Commission, and to include intervenor participation and to make participant funding available in such proceedings. The Commission may consider including interventions when there are items that are of Indigenous and public interest. For example, the Commission may consider holding a proceeding on an environmental protection review (EPR) report and on outcomes of a periodic safety reviews (PSR), in a similar manner as the ROR.

3.4 Conclusion

The CNSC's regulatory program includes multiple and varied engagement activities that will continue to be implemented and adjusted to meet the needs of the audience regardless of the licence period. Opportunities currently exist for CNSC staff, licensees, and intervenors to engage directly with the Commission.

Under the NSCA, the Commission has the authority to request, at any time, an update on any subject of concern throughout the proposed licensing period and involve intervenors in public proceedings.

4. Responses to Commission Requests and Interventions

4.1 Periodic Safety Reviews

According to the Darlington NGS licence renewal Part 1 Commission hearing proceeding transcript, the Commission expressed interest in topics related to the periodic safety review.

CNSC regulatory document REGDOC-2.3.3, Periodic Safety Reviews was published in 2015 and states that the objectives of a periodic safety review (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 systems, structures, and components (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

A 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 plant safety and the quality of the safety documentation, and to determine reasonable and practical improvements to ensure safety until the next PSR or, where appropriate, until the end of commercial operation. A PSR is complementary to, and does not replace, routine and non-routine regulatory reviews, inspections, event reporting and investigations, or other CNSC compliance and verification activities.

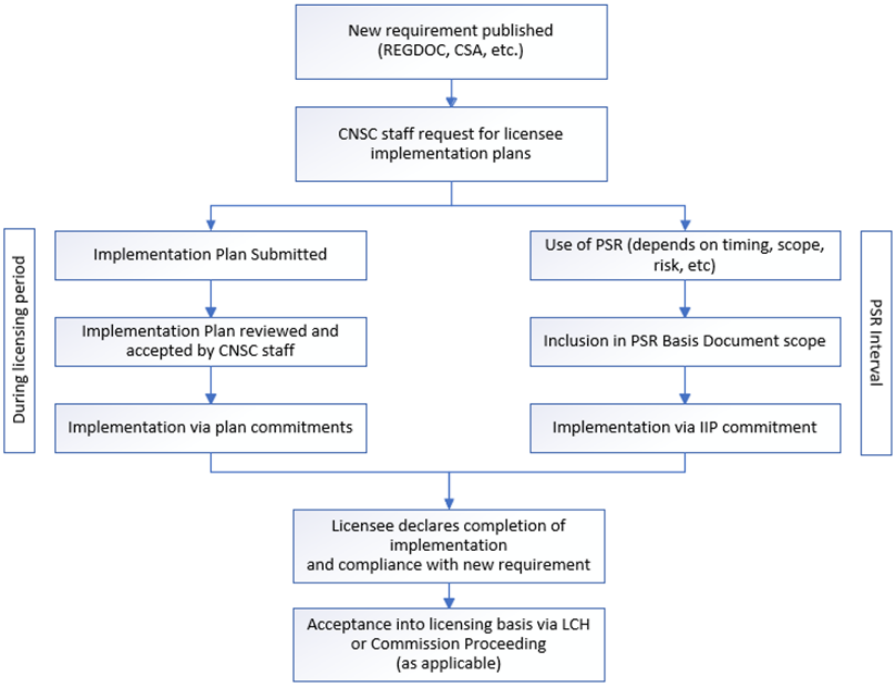
A PSR is not tied to a licence period; however, in accordance with *IAEA SSG-25, "Periodic Safety Reviews"* and international practice, 10 years is considered an appropriate interval between PSRs to identify any factors that would limit the NPP's continued safe operation and determine the extent to which it conforms to applicable modern codes, standards and practices. The *Class 1 Nuclear Facility Regulations* require that a PSR be conducted at all NPPs at "an interval defined in the licence". This is being proposed as a modified licence condition in the draft licence and the interval is set to 10 years.

Canada's performance-based approach, licensing principles and mature compliance oversight program, leverages the PSR process as a regulatory instrument to complement the "current state of a facility" by requiring the licensee to evaluate the existing design, condition and operation of a nuclear power plant

against modern codes and standards that may not yet be introduced into the facility's licensing basis.

In Canada, a new code or standard does not necessarily become a regulatory requirement at the time of publication. When a new code or standard is introduced/published, it must be implemented by a licensee before it is incorporated or "accepted" into the licensing basis for the facility. There are two main vehicles used to implement modern codes and standards, illustrated below:

Figure 1: Implementation of codes and standards



When PSR is selected as the appropriate vehicle to use for a particular modern code or standard, it is included in the scope of the PSR through the Basis Document. The requirements around the content of a particular PSR become governed by the CNSC's acceptance of the PSR Basis Document, the first of four (4) main deliverables of the PSR process. These are briefly described below.

- The PSR Basis Document sets out the scope and methodology for conducting the PSR as well as the "code freeze date" and the list of Laws, Regulations, Codes and Standards to bind the project scope.

- The Safety Factor Reports contain the assessment of review tasks and of modern laws, regulations, codes, and standards as well as the review of OPG program effectiveness against IAEA SSG-25 Review Tasks. These reports require CNSC staff review and in Canada, there are fifteen (15) such Safety Factors and associated reports.

- The Global Assessment Report (GAR) presents an overall assessment of the PSR results, including interdependencies between the various Safety Factors, strengths, gaps, defence-in-depth, and overall plant safety. Like the Safety Factor Reports, the GAR requires CNSC staff review but not formal regulatory acceptance.

- The Integrated Implementation Plan (IIP), which requires CNSC staff review and acceptance, addressed the results of the global assessment, listing scheduled corrective actions and safety enhancements (including any physical modifications) that address the gaps identified in the PSR.

  Since the modern codes and standards selected for review in a PSR and defined in the Basis Document, are not yet regulatory requirements, the assessment against them, can offer valuable insights as to how a licensee would comply with them if they were requirements today and what would be necessary in order to achieve said compliance. In the latter case, it is expected that such activities required to achieve compliance would be included in the IIP. It is this approach that positions the PSR as a valuable tool in supporting longer term operating plans, major activities such as refurbishment and providing confidence for the regulator that continuous improvement will be sought and prioritized.

  OPG conducted a PSR [3] (named D-PSR) in support of the requested renewal of the operating licence for Darlington NGS beyond 2025. OPG stated in its letter of February 4, 2020, that it intended to advance the timeline of the D-PSR to re-align with the licensing period approved by the Commission (2025), rather than to the conclusion of the ISR-IIP (2028), also approved by the Commission via RD-360. This would allow OPG to leverage the D-PSR work and resulting IIP to support the application for licence renewal in 2025, maintain the national and international expectation that PSRs be conducted every 10 years and permit a focus on post-refurbishment activities at Darlington (refurbishment-related activities are covered by the ISR-IIP).

  The D-PSR IIP was accepted by CNSC staff on March 25, 2024. It contains seventeen (17) tasks, covers a period from 2025-2035, and is expected to be completed by November 2028. CNSC staff have concluded that OPG conducted the Darlington PSR in accordance with REGDOC-2.3.3, and have begun implementing the commitments made in the IIP to support continued operation for the period of 2025-2035. As of December 31, 2024, OPG has completed 11 of the 17 actions and have submitted documentation to the CNSC for closure.

Table 5: A summary of the 17 IIP tasks

Global Issue	Topic	Number of Tasks	Status (as of December 31, 2024)	SCA
GI-05	Alignment with 2015 edition of National Building Code of Canada (NBCC)	1	Complete, pending CNSC closure	Emergency Management and Fire Protection

GI-11	Pressure Tubes – Submission of documentation for implementation of N285.8-15 (Update No. 1)	2	2 of 2 complete, pending CNSC closure **Note that review work was completed under an existing project (IIP task was to capture the submission of documentation commitment only)*	Fitness for Service
GI-12	Transition plan for CSA N285.7-21 (Balance of Plant Periodic Inspection Programs)	2	2 of 2 complete, pending CNSC closure	Fitness for Service
GI-15	Implementation of CSA N290.9-19 (Reliability and Maintenance Programs)	4	1 of 4 complete, pending CNSC closure	Fitness for Service
GI-16	Implementation of CSA N287.1-17 (Concrete Structures Periodic Inspection Program)	4	3 of 4 complete, pending CNSC closure	Fitness for Service
GI-21	Mapping of specific Component Condition Assessment items and updates for the Tritium Removal Facility Periodic Inspection Program	4	2 of 4 complete, pending CNSC closure	Fitness for Service

4.2 Event Initial Report: Potential Neutron Exposure of Workers

One intervention expressed concern and questions regarding the Event Initial Report (EIR) on Potential Neutron Exposure of Workers (CMD 24-M35)[5].

Following the identification of unanticipated neutron emissions in June 2024 at the Darlington Nuclear Generating Station, CNSC staff initiated reactive compliance oversight activities. These actions included the deployment of CNSC site inspectors to conduct targeted reactive inspections focused on verifying the adequacy of protective measures implemented for OPG workers. These inspections confirmed that:

- Surveys of neutron hazards were actively conducted;
- Radiation Exposure Permits (REPs) were updated to reflect in-field conditions;
- Neutron doses were ascertained and assigned appropriately;
- Radiation hazard signage was posted in accordance with licensee Radiation Protection Programs;
- Affected workers were informed, and Health Physicists were available to address any questions.

To ensure a comprehensive industry-wide response, CNSC staff issued a request under **subsection 12(2) of the General Nuclear Safety and Control Regulations** [8] to all Canadian NPP licensees. This request required licensees to submit:

- A summary of work activities with potential for unaccounted neutron dose and a conservative estimate of that dose;
- An assessment of whether the unaccounted dose resulted in any exceedance of the effective dose limits (one-year and five-year periods);
- A description of methods, models, and assumptions used to ascertain neutron doses;
- A detailed characterization of the neutron source term;
- Confirmation of whether a neutron source term was included in original reactor waste source term characterizations;
- A summary of additional work controls implemented to mitigate future exposures;
- Confirmation that affected personnel had been informed.

CNSC staff have reviewed the information provided by licensees in response to the 12(2) request [9] and conclude that the event **did not result in adverse impacts** on the health and safety of workers or the public, nor on the environment. While research is ongoing, the licensing basis remains adequate and oversight and reporting on this issue will continue.

This conclusion is based on the following:

- Measured neutron dose rates from affected waste containers at OPG were low.
- Conservative historical dose estimates confirmed that no worker exceeded regulatory dose limits.
- The affected containers are stored in restricted-access areas, not routinely entered by workers or accessible to the public.
- Radiation Protection Governance procedures at OPG have been updated and apply across all OPG nuclear sites.
- Extent-of-condition surveys completed across OPG facilities confirmed that the neutron hazard was limited to specific refurbishment waste types.

4.3 Climate Change

Several interventions expressed concerns related to climate change and its impact during a 30-year licence period.

The CNSC ensures that the potential effects of climate change on the safety of nuclear facilities and of the surrounding environment are considered throughout the nuclear facility's lifecycle. CNSC regulatory requirements ensure that potential effects are identified and mitigated properly. These requirements are related to environmental and safety assessments, which take place regularly throughout a facility's lifecycle, regardless of licence duration. These assessments include the following, which are conducted by the licensee: Periodic Safety Review conducted every 10 years, the Probabilistic Safety Assessments conducted every 5 years, and Environmental Risk Assessments conducted every 5 years (or more frequently if major changes to the facility are proposed). The cyclical nature of these assessments and reviews ensures that any changes in climatic conditions that could have an impact on safety, or the environment are taken into account. When reviewing these documents, CNSC staff consider whether up-to-date climate related information has been included and considered by the licensee.

The CNSC has a memorandum of understanding with Environment and Climate Change Canada (ECCC) that includes collaboration related to climate change, through various methods such as ECCC contributing expertise on climate modelling, future climate projections, estimates of probable maximum precipitation and intensity duration frequency curves.

In preparation for Darlington relicensing hearings, CNSC staff requested that OPG conduct a climate change resiliency assessment [10]. OPG responded to CNSC staff's request [11], indicating their intent to conduct the assessment using the Electric Power Research Institute Climate Vulnerability Assessment Guidance for Nuclear Power Plants, which aligns with ECCC Technical Guide related to the Strategic Assessment of Climate Change: Assessing Climate Change Resilience. This assessment will evaluate the exposure of different components of the plant to climate hazards which will lead to a vulnerability assessment where the interactions of the exposed assets and the climate-related hazards are considered to understand the potential impact on nuclear safety. The result of this resilience assessment is to be submitted to CNSC staff by February 25, 2027. OPG's plans for completion of this assessment are acceptable to CNSC staff. CNSC staff note that the existing processes in place, as mentioned above, serve to ensure safety and protection of the environment. The climate change resilience assessment will provide forward looking supporting information on this topic to complement existing regulatory requirements.

4.4 Decommissioning and Long-Term Waste Management

Several interventions expressed concerns related to the storage of additional waste generated during a 30-year licence term.

The current decommissioning plan for the Darlington NGS was submitted to the CNSC in 2022 in support of OPG's consolidated financial guarantee application to the Commission for acceptance [12]. This application was submitted to meet the 5-year renewal requirement for all OPG licensed facilities that expired at the

end of 2022. On December 6, 2022, the Commission accepted the revised consolidated financial guarantee for the next 5-year period, from 2023 to 2027.

The current decommissioning plan for the Darlington Nuclear Generating Station estimates the following dates for shut down of each reactor unit:

a. Unit 2, End of life, December 2050;

b. Unit 3, End of life, December 2053;

c. Unit 1, End of life, December 2055; and

d. Unit 4, End of life, December 2056.

These estimated dates incorporate the life extension of each unit following refurbishment.

It is important to note that these dates are not fixed and are estimates used for planning purposes. Changes to these estimates will have impacts on the financial planning for the financial guarantee and would be captured in a future revision to the decommissioning plan.

The current decommissioning plans for the Used Fuel Dry Storage Buildings (UFDSBs) expect that these facilities will be dismantled concurrently with their corresponding station (ie. DWMF will be dismantled concurrently with Darlington NGS). Used fuel will be removed from these facilities and transferred to a licensed long term-storage facility before dismantling activities, nominally the Deep Geologic Repository (DGR).

The current decommissioning plan for the Darlington NGS was prepared before the Minister of Energy and Natural Resources Canada endorsed the recommendations put forward by the Nuclear Waste Management Organization (NWMO) in the Integrated Strategy for Radioactive Waste. This strategy proposed broadening the mandate of the NWMO to include the long-term management of intermediate-level waste (ILW), in addition to high-level waste (HLW). The result of this change is that OPG is responsible for the long-term management of all low-level waste (LLW) and will transfer ownership of the other two classes of waste to the NWMO when it has prepared a suitable long-term management solution. For financial planning purposes, this change does not have a significant effect as OPG based its current financial guarantee on the assumption that it was responsible for the long-term management of both LLW and ILW.

As of May 2025, the NWMO has selected a site to host the DGR near the Township of Ignace in the traditional territory of Wabigoon Lake Ojibway Nation, and is developing a site selection process for a second deep geological repository for intermediate-level and non-fuel high-level waste and potentially used nuclear fuel from new nuclear projects.

CNSC staff expect the next revision of the Darlington NGS decommissioning plan, beginning in 2028, to include details regarding how Canada’s Integrated Strategy for Radioactive Waste has been incorporated, including the planning for a long-term management solution for LLW.

4.5 Environmental Releases - Tritium

Several interventions expressed concern related to environmental releases, especially those related to tritium action level exceedances from the Tritium Removal Facility (TRF). The exceedances of concern are listed below.

The Environmental Action Level (AL) for tritium oxide is 9.88E+13 Bq/week and this AL was exceeded for the week ending September 4, 2023, due to a release of 2.40E+14 Bq primarily from the TRF. ALs serve as an early warning system to indicate a potential loss of control. Exceeding an AL requires notification and reporting to the CNSC, investigation of the cause, and corrective action as required. The weekly operational derived release limit (DRL) for Tritium Oxide is 7.52E+14 Bq/week, the release represents 31.9% of the weekly DRL. DRLs are calculated to demonstrate that releases are below the annual dose limit to the public of 1 mSv. This event was due to failed components in the Tritium Immobilization System. The main condition in this event surrounds the venting of the Immobilization Tritium Cannister to the Air Cleanup System. The release was airborne through a monitored pathway. This event indicated a need for continued maintenance work and improved processes within the TRF and OPG has implemented corrective actions to address these issues. CNSC staff reviewed the event and confirmed that corrective actions to minimize further releases were deemed appropriate and adequate.

The AL for elemental tritium is 3.81E+13 Bq/week and this AL was exceeded for the emission reporting week ending January 29, 2024, due to a 4.61E+13 Bq contribution for the week from the TRF stack. The weekly operational DRL for elemental tritium is 1.20E+16 Bq/week which is based on dose, the release represents 0.38% of the weekly DRL. This action level exceedance occurred a result of maintenance work for the replacement of a ruptured disc between the High Tritium Column, which concentrates elemental tritium and the Tritium Immobilization System which captures and immobilizes it. To protect workers executing the replacement, the upstream lines containing elemental tritium needed to be purged prior to the replacement which led to the initial elevated release of elemental tritium beginning on January 19, 2024. There was an additional elevated tritium release that occurred on January 25, 2024, as the ruptured disc was being removed and replaced. As part of this event's actions, OPG has formalized a process for Temporary AL regulatory exemptions, which involves notifying the CNSC. Temporary ALs are used to support planned maintenance work activities at the TRF, which is necessary to maintain the effectiveness of the Environmental Protection Program. Temporary AL notifications for this work are in accordance with CSA N288.8:17 *Establishing and implementing action levels for releases to the environment from nuclear facilities*, Sections 9.6 and 9.7 and these planned maintenance events do not represent a loss of control event.

4.6 Emergency Planning Zones/Ingestion Planning Zones

Several interventions expressed concern related to the determination of emergency planning zones, including ingestion planning zones.

In Canada, the respective roles of the various levels of government in nuclear emergency management are derived from legislated responsibilities. Provincial and territorial governments bear the primary responsibility for protecting public health and safety, property and the environment within their borders and are ultimately responsible for the offsite response and the implementation of protective actions and measures. In Canada the offsite authorities determine the size of emergency planning zones (EPZs), however regardless of the chosen size of EPZs, the requirements for emergency planning will be based on the facility's planning basis on the potential offsite impacts. Emergency planning distances (EPDs) can also be considered as part of offsite planning. The distances are used to identify distances plumes could travel beyond EPZs and still need consideration for protective actions by off-site authorities.

- EPZs define the areas beyond the boundary of a reactor facility, in which implementation of operational and protective actions are or might be required during a nuclear emergency, to protect public health, safety, and the environment. EPZs are tools that are predefined to allow offsite authorities the ability to make immediate and prompt decisions in case of a nuclear emergency. The EPZs are determined by scientific analysis of potential accidents scenarios at the nuclear facility while taking into account offsite considerations such as population density, evacuation time estimates, topography and weather patterns and other considerations as applicable. In Ontario, Emergency Management Ontario (EMO) is responsible for determining the size of the EPZs, at the Darlington NGS site these are:
- Automatic Action Zone (AAZ) – 3 km
- Detailed Planning Zone (DPZ) – 10 km
- Contingency Planning Zone (CPZ) – 20 km
- Ingestion Planning Zone (IPZ) – 50 km

In the AAZ and DPZ, detailed plans and comprehensive arrangements for which emergency planning and preparation are developed in advance, to ensure that necessary and effective protective actions can be taken to protect the public, property, or the environment in case of an accident. The primary aim is preventing or reducing deterministic effects from radiation exposure. The protective actions are evacuation, relocation, shelter in place and/or consummation of ITBs. The decision to ingestion KI pills is made by the Chief Medical Officer of the Province in collaboration with Provincial emergency response agency.

In the CPZ and IPZ, plans and arrangements are established at the preparedness stage, where actions may need to be taken during the response for which only limited plans and arrangements, for contingency planning and ingestion controls, are developed in advance. This forms the EPD, which is necessary to address level 5 of defense in depth for all facilities. The primary aim is preventing or reducing stochastic effects from radiation exposure.

Following the events at Fukushima Daiichi Nuclear Power Plant, additional actions were taken by offsite authorities in planning and preparedness for nuclear emergencies. This included the designation of the CPZ, where contingency planning and arrangements are made in advance, so that during a nuclear emergency, protective actions can be extended beyond the DPZ as required to reduce potential for exposure and KI pill pre-stocking for distribution in the CPZ and IPZ.

For clarity, ingestion control measures would be implemented from the onset of a nuclear emergency in all zones. However, the IPZ differs from all the other zones in that it is a pre-designated area surrounding a reactor facility where plans and arrangements are made to:

- Protect the food chain
- Protect drinking water supplies
- Restrict consumption and distribution of potentially contaminated produce
- Restrict distribution of non-food commodities

Offsite nuclear emergency response planning for the Darlington NGS site is detailed in the Darlington Implementation Plan of the Provincial Nuclear Emergency Response Plan (PNERP) and it is administered by EMO. Nuclear emergency planning is continually being updated, to ensure plans are up to date, planning data from the Municipalities such as population estimates, institutional data and critical infrastructure, are used to inform the PNERP. In addition, evacuation time estimate studies are conducted based on current census data and future population growth projections on a per-decade estimation until end of life of the reactor facility.

IAEA Safety Standard GSR Part 7 *Preparedness and Response for a Nuclear or Radiological Emergency* establishes the requirements for preparedness and response to a nuclear or radiological emergency. CNSC's REGDOC 2.10.1 – Nuclear Emergency Preparedness and Response sets out the nuclear emergency preparedness requirements for Canadian nuclear facilities and it is aligned with IAEA's GSR Part 7. In 2019, Canada welcomed the IAEA lead Emergency Preparedness Review (EPREV) mission to review Canada's nuclear emergency preparedness framework against the IAEA GSR Part 7. The international team of subject matter experts published their findings and concluded that Canada has a well developed and mature nuclear emergency preparedness and response system in place across all levels of government and that Canada is ready to respond to a nuclear emergency.

The IAEA has also published a guidance document in their Emergency Preparedness and Response series titled "*Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor*". The aim of the document is to provide the basic information and criteria needed by a decision maker in order to protect the public during an emergency involving severe fuel damage in a light water reactor (LWR) or graphite moderated reactor (RBMK) core and/or spent fuel pool. This publication contains suggested maximum radius

for emergency planning zones based on the thermal power of LWRs. This publication has been referenced many times in opposition to the established EPZ sizes in Canada. While this publication is insightful it is important to note that the publication is based on the LWR technology and is not representative of the PHWR CANDU technology. Specifically, the zone sizes were conservatively developed based on a worst-case accident for a 3000 MW(th) Light Water Reactor resulting in a 10% core release, in order to encompass the large variety of nuclear reactor technologies operating throughout the world. The IAEA notes that these calculations are very uncertain and based on very simple assumptions. Additionally, these calculations are intended to be a first approximation and may be modified to be compatible with specific power plant analysis and local conditions.

At the Darlington NGS site, the emergency planning zone distances are established based on the consequences of a range of accidents, including severe core damage accidents and multi-unit accidents. The size of the EPZ is based on the goal to eliminate severe deterministic health effects and reduce the risks of stochastic health effects by implementing protective actions to keep the doses to the public below the generic dose criteria. These criteria are the same as those recommended by the IAEA.

With the ongoing development of the Darlington site which includes the construction one BWRX-300 reactor at the DNNP site, the emergency preparedness for the whole site has been assessed to ensure adequate measures are being taken to protect workers from a nuclear accident from the Darlington NGS site. As the DNNP site develops, the nuclear emergency planning will also be revised to ensure nuclear emergency response is commensurate with the risks of both sites. REGDOC 2.10.1 requires that multi-unit accidents form the planning basis, as part of the DNNP licencing the impact of one station onto another from a nuclear response perspective will be assessed.

4.7 Conventional Health and Safety Events - Refurbishment

One intervention expressed concerns regarding Conventional Health and Safety (CH&S) by citing specific events that occurred in 2024 and 2025, including incidents associated with the Darlington Refurbishment Project.

The Darlington Refurbishment Project constitutes a major construction activity and is subject to conventional hazards. The large scale of the project, which has seen multiple units in outage during the period in question, employs both OPG staff and a large number of external contractors. All workers are expected to adhere to OPG's robust CH&S program or equivalent contractor programs, which are subject to OPG approval, audits and oversight.

In Ontario, conventional health and safety is regulated by the *Occupational Health and Safety Act* (OHSA) of Ontario and the *Labour Relations Act* of Ontario. The CNSC has a Memorandum of Understanding with the Ontario Ministry of Labour, Immigration, Training and Skill Development (MOL) to cooperate and exchange information and technical expertise related to their

respective areas of jurisdiction, such as occupational health and safety practices at nuclear facilities. There has been regular communication between CNSC staff and the MOL regional office regarding any issues at site, including some of those listed in the intervention.

During the last licensing period, CNSC staff conducted 43 compliance verification activities, including 3 Type II and 40 Field inspections to assess CH&S. Except for a medium finding in 2016, related to control and minimization of confined space entry, which has since been closed, all others have been compliant or of low and negligible safety significance when assessing compliance against regulatory requirements, including the OHSA or the *Labour Relations Act* (Ontario). In addition, to date, CNSC staff have conducted 7 refurbishment training-related inspections, primarily focusing on areas such as contractor management, onboarding, and oversight, in which health and safety was a noted component. The OPG Training Program at Darlington Refurbishment met requirements in all cases. There were some low safety significance non-conformances with OPG training procedures identified, which were addressed by OPG corrective actions and have since been closed.

Further to the discussion provided in CMD 25-H2 regarding the station's CH&S ratings since 2016, based on CNSC staff compliance verification activities performed in 2024, and Performance Indicator data, the CH&S SCA is expected to be rated as Satisfactory.

Additional 2024 safety performance highlights include:

- Zero Lost-Time Injuries (LTI) were reported at Darlington.
- Three medically treated injuries occurred in Units 1, 2, and 3, while the refurbishment unit reported six medically treated injuries.
- The Accident Severity Rate remained at 0.00 due to no LTIs.
- The Accident Frequency for Darlington NGS was 0.08, an improvement from 0.16 in 2023, and consistent with the rates reported in 2022 and 2021.

CNSC staff remain informed of CH&S events through surveillance and monitoring activities, and through mandatory reporting under REGDOC-3.1.1 and MOL reporting requirements. All events which may affect the health and safety of workers are taken seriously and acted upon, including lower-level events, near misses or event precursors. In response to some events, OPG has initiated full work stand-downs and conducted safety town halls to reinforce expectations for safe work practices and a strong safety culture. CNSC staff review the events, and the corrective actions implemented to prevent further occurrences. With respect to the refurbishment events listed in the intervention, of note is the Unit 4 event which saw a worker mistakenly cut into a live 600v cable; this event was investigated by the MOL, with CNSC staff accompanying for part of the interviews with OPG. There were no injuries resulting form this event and the MOL did not issue any orders or actions. CNSC staff continue to follow corrective actions implemented by OPG to ensure correct component verifications when conducting electrical work.

As noted by intervenors, CNSC staff are aware of the recent number of CH&S events that can be attributed to human performance (HP) and are currently conducting an HP compliance assessment and additional surveillance and monitoring activities. Currently, CNSC staff are attending senior management meetings and managers in the field activities to observe how senior managers are promoting and fostering a healthy safety culture.

As a result of the increased number of CH&S related, HP events at Darlington, OPG has implemented the Darlington Organizational Recovery Plan. The plan shows three identified gaps including lack of engaging the workforce, some challenges in effective leadership. Implementation of the recovery plan is ongoing with several corrective actions completed.

Some of the improvements noted by OPG are:

- OPG has implemented sessions where Senior Management engage and communicate with workers.
- There is an observed upward trend for the number of Leadership and paired observations which help to identify positive trends and vulnerabilities/blind spots.
- Wednesday Leaders in the Field initiative has been implemented.
- Leadership Continued Training for Procedure Use and Adherence has been implemented.
- The number of Station Condition Records coded with a human performance flag show a downward trend.

CNSC staff are satisfied with OPG's Darlington Organizational Recovery Plan and will continue to track outstanding actions.

Finally, every six months, OPG provides an HP in Refurbishment update to CNSC staff. The updates include information on any new or previously discussed HP events and any implemented corrective actions. This bi-annual meeting has been in place since refurbishment started in 2016.

Through the implementation of their CH&S and the corrective actions taken to address events, OPG and its contractors have demonstrated a commitment to protecting worker safety. This is further supported by the HP initiatives discussed above. With refurbishment activities at Darlington coming to an end, it is expected that conventional hazards in the facility will return to baseline, pre-refurbishment levels and conventional health and safety events will further decline in number. CNSC staff acknowledge the concerns raised by the intervener and will continue to maintain strong oversight in this area to ensure continuous improvement and the protection of all workers. CNSC staff continues to work with all interested parties, including contractors, plant employees & management and MOL inspectors to ensure CH&S remains the overriding priority for the remainder of the refurbishment project, for normal operations and any future initiatives that may be undertaken at Darlington during the next licensing period, regardless of duration.

5. Overall Conclusions and Recommendations

In this CMD, CNSC staff have provided information regarding a topic of interest raised by the Commission during Part 1 of the Darlington NGS Licence Renewal Commission hearing, held March 26, 2025, as well as additional information regarding some themes noted in the interventions received for Part 2 of the Darlington NGS Licence Renewal Commission hearing.

CNSC staff provide the following recommendation regarding the duration of the licence period:

- Accept OPG's proposed licence length of 30 years.
- Introduce a new licence condition for OPG to conduct ongoing Indigenous engagement activities.

The new licence condition is a notable change of the licensing basis to ensure that OPG will continue engagement with Indigenous Nations and communities throughout the licence period. In particular, CNSC staff support OPG's proposal, developed in consultation with Indigenous Nations and Communities, for decennial reviews during the licence period.

CNSC staff recommend the following:

1. **Conclude,** pursuant to paragraphs 24(4)(a) and (b) of the *Nuclear Safety and Control Act* **(NSCA) in that the licensee/applicant:**

    a) **Is qualified** to carry on the activities authorized by the licence

    b) **Will make adequate provision** for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

2. **Renew** the Darlington NGS PROL authorizing OPG to carry out the licenced activities listed in part IV of the proposed licence
3. **Delegate** the authority to the CNSC staff as set out in section 5.6 of CMD 25-H2

References

Background

1. CNSC document, Darlington Nuclear Generating Station Power Reactor Operating Licence, [e-Doc 7460944].

Licence Periods

2. CNSC document, CMD 02-M12, New Staff Approach to Recommending Licence Periods, March 1, 2002, [e-Doc 1032588].

Engagement

3. CNSC document, Event Initial Report – Contaminated Motors Shipped to Unlicensed Vendor, [e-Doc 5190224].
4. CNSC document, Event Initial Report – Retube Waste Processing Building – Internal Contamination Event, [e-Doc 5473049].
5. CNSC document, Event Initial Report – Potential Neutron Exposure of Workers, [e-Doc 736622].

Responses to Commission requests and interventions

6. OPG Letter, R. Geofroy to A. Mathai, "Submission of the Darlington NGS Periodic Safety Review (D-PSR): Integrated Implementation Plan (IIP) Report", September 13, 2023, NK38-CORR-00531-24800, [e-Doc 7125642].
7. CNSC Letter, A. Mathai to A. Grace, "Darlington NGS – Periodic Safety Review (D-PSR) – CNSC Staff Acceptance of the Integrated Implementation Plan (IIP)", March 25, 2024, [e-Doc 7248767].
8. CNSC letter, A. Viktorov to A. Grace, R. Geofroy, K. Aggarwal, "Request pursuant to Subsection 12(2) of the General Nuclear Safety and Control Regulations: Potential Neutron Exposure of Workers", June 13, 2024, N-CORR-00531-2401, [e-Doc 7299458].
9. OPG letter, A. Grace, P. Seguin, K. Aggarwal to C. Salmon, A. Viktorov, "OPG – Response to CNSC Request pursuant to Subsection 12(2) of the General Nuclear Safety and Control Regulations: Potential Neutron Exposure of Workers", January 31, 2024, N-CORR-00531-24262, [e-Doc 7455883].
10. CNSC letter, A. Baig to A. Grace, Darlington Nuclear Generating Station: CNSC staff technical sufficiency review of the application to renew the power reactor operating licence, August 1, 2024, NK38-CORR-00531-25589, [e-Doc 7334720].
11. OPG letter, A. Grace to A. Mathai, Darlington NGS - OPG update to CNSC staff technical sufficiency review of the application to renew the power reactor operating licence: Action item OPG-2024-33652, December 4, 2024, NK38-CORR-00531-25777, [e-Doc 7421404].
12. OPG letter, C. Carmichael to N. Greencorn, K. Campbell, J. Burta, L. Sigouin, Submission of Preliminary Decommissioning Plans, January 25, 2022, N-CORR-00531-23047, [e-Doc 6726631].

Glossary

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

PART 2

Part 2 of this CMD provides all relevant information pertaining directly to the licence, including:

1. The revised draft power reactor operating licence
2. The revised draft licence conditions handbook.

Draft Power Reactor Operating Licence

(Draft version inserted on next page)

Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Word Ref.: e-Doc 7434481
PDF Ref.: e-Doc7533397
File/ Dossier: 2.01

NUCLEAR POWER REACTOR OPERATING LICENCE

DARLINGTON NUCLEAR GENERATING STATION

I) LICENCE NUMBER: **PROL 13.00/2055**

II) LICENSEE: Pursuant to section 24 of the *Nuclear Safety and Control Act* this licence is issued to:

Ontario Power Generation Inc
700 University Avenue
Toronto, Ontario
M5G 1X6

III) LICENCE PERIOD: This licence is valid from December 1, 2025 to November 30, 2055, unless suspended, amended, revoked or replaced.

IV) LICENSED ACTIVITIES:

This licence authorizes the licensee to:

(i) operate the Darlington Nuclear Generating Station, including equipment for the production of radionuclides identified in (vi) and the Darlington Tritium Removal Facility housed within the Heavy Water Management Building (hereinafter "the nuclear facility"), at a site located in the Municipality of Clarington, in the Regional Municipality of Durham, in the Province of Ontario;

(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) import and export nuclear substances, except controlled nuclear substances, that are required for, associated with, or arise from the activities described in (i);

(iv) possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i);

(v) possess, transfer, process, package, manage and store the nuclear substances associated with the operation of the Darlington Tritium Removal Facility;

(vi) produce, possess, transfer, use, package, manage and store nuclear substances that are required for, associated with, or arise from the activities associated with operations of the Darlington Nuclear Generating station and activities described in (i) associated with production of:

(1) Co-60; and
(2) Y-90, Mo-99 and Lu-177

Including the associated decay radionuclides.

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 Darlington NGS Licence Conditions Handbook (LCH) provides compliance verification criteria including the Canadian standards and regulatory documents 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 recommendations and 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 notification of changes to the facility's safety and control measures that impact 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.

G.7 The licensee shall implement and maintain an Indigenous engagement 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.

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 Reactor Facility Workers, Version 2.

Workers who began an applicable initial training program in accordance with the requirements outlined in REGDOC-2.2.3, Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants, before January 31, 2025, may continue to be certified under requirements of this version until January 31, 2030.

Persons appointed to the following positions require certification:

(i) Responsible Health Physicist;
(ii) Shift Manager;
(iii) Control Room Shift Supervisor;
(iv) Authorized Nuclear Operator; and
(v) Unit 0 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.

3.4 The licensee shall conduct and submit, results of a periodic safety review at least every 10 years.

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.

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 plan.

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 of nuclear substances program.

15. Nuclear Facility-Specific

15.1 The licensee shall implement and maintain an operations program for the Tritium Removal Facility, which includes a set of operating limits.

15.2 The licensee shall implement a return to service plan for refurbishment.

15.3 The licensee shall implement the Integrated Implementation Plan.

15.4 The licensee shall obtain the approval of the Commission, or consent of a person authorized by the Commission, prior to the removal of established regulatory hold points.

15.5 The licensee shall limit the activities of import and export of nuclear substances to those occurring as contaminants in laundry, packaging, shielding or equipment.

15.6 The licensee shall implement and maintain an operations program for the use of the Target Delivery System to produce the radionuclides described in section IV (vi) (2).

15.7 The licensee shall implement and maintain a Co-60 operations program for the activities described in part IV of the licence.

Draft Licence Conditions Handbook

(Draft version inserted on next page)

Canada's Nuclear Regulator

e-Doc 7445268 (Word)

e-Doc 7445267 (PDF)

LICENCE CONDITIONS HANDBOOK

LCH-PR-13.00/2055-R000

DARLINGTON NUCLEAR GENERATING STATION
NUCLEAR POWER REACTOR OPERATING LICENCE

LICENCE # PROL 13.00/2055

Canadian Nuclear Safety Commission
Commission canadienne de sûreté nucléaire

Canada

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Licence Conditions Handbook **Effective:** **Pending**

LCH-PR-13.00/2055-R000

Darlington Nuclear Generating Station
Nuclear Power Reactor Operating Licence

PROL 13.00/2055

SIGNED at OTTAWA: Pending.

Dr. Alex 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 #
Pending	R000	Word e-Doc 7445268 Signed PDF embedded 7445267	First Issue	Word e-Doc 7445270 Signed PDF embedded 7445269

TABLE OF CONTENTS

PART I – INTRODUCTION

The purpose of the Licence Conditions Handbook (LCH) is to identify and clarify the relevant parts of the licensing basis for each licence condition (LC).

Paragraph 24 (1) of the 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."

The licence pertaining to this licence conditions handbook (LCH) authorizes the licensee to:

(i) operate the Darlington Nuclear Generating Station, including equipment for the production of radionuclides identified in (vi) and the Darlington Tritium Removal Facility housed within the Heavy Water Management Building (hereinafter "the nuclear facility"), at a site located in the Municipality of Clarington, in the Regional Municipality of Durham, in the Province of Ontario;

(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) import and export nuclear substances, except controlled nuclear substances, that are required for, associated with, or arise from the activities described in (i);

(iv) possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i);

(v) possess, transfer, process, package, manage and store the nuclear substances associated with the operation of the Darlington Tritium Removal Facility;

(vi) produce, possess, transfer, use, package, manage and store nuclear substances that are required for, associated with, or arise from the activities associated with operations of the Darlington Nuclear Generating station and activities described in (i) associated with production of:
(1) Co-60; and
(2) Y-90, Mo-99 and Lu-177
Including the associated decay radionuclides.

The LCH is organized in accordance with the LCs. The LCs themselves are organized, to a large degree, per the CNSC's safety and control area (SCA) framework [e-Doc 3410839, Safety and control areas]. The LCH content for each LC is typically applicable to all activities authorized by the licence. However, some

LCs are specific to certain licensed activities; in such cases the LCH clarifies the licensing basis only in the context of the specific activity referenced in the LC.

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 compliance with the LC and hence are the basis of the compliance plan for this facility. Guidance may provide additional information relevant to implementation of the LC. For example, IAEA safety standards provide valuable guidance for many LCs. Note, however, that documents in the Guidance section are not surrogates for CVC.

Some documents, including licensee documents and publications, that are cited in this LCH are not publicly available (e.g., documents containing proprietary information or prescribed information as defined by the *General Nuclear Safety and Control Regulations)*. Publicly-unavailable CNSC documents cited in the LCH are provided to the licensee upon request.

Interaction between the licensee and CNSC staff that is described in this LCH is governed by any communication protocols that may be established between the two, unless specified otherwise in the LCH.

Current versions of the licensee documents listed in this LCH (except COG documents) are recorded in CNSC document "OPG Darlington NGS PROL Written Notification Documents in LCH" (e-Doc 3959167), which is controlled by the Darlington Regulatory Program Division.

PART II – FACILITY SPECIFIC

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
(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

CNSC regulatory document REGDOC-3.5.3, *Regulatory Fundamentals* describes what constitutes the licensing basis of a nuclear facility or activity.

This LC is not intended to inhibit the licensee's ability to implement changes that remain within the licensing basis.

For some specific changes, the licensing basis has provisions for CNSC staff to confirm whether the change would be in accordance with the licensing basis. These are referred to as 'CNSC staff authorizations.' Examples include terms or conditions in the licensing basis that permit or constrain a particular activity by means of a phrase such as:

- "approved in writing by the Commission or a person authorized by the Commission"
- "without the written approval of the Commission or a person authorized by the Commission"
- "requested by the Commission or a person authorized by the Commission"
- "prior written approval of the Commission, or prior written consent of a person authorized by the Commission"

As another example, licensing basis publications (e.g., CNSC regulatory documents or CSA Group standards) or other licensing basis requirements may include a requirement to obtain the acceptance or approval from the regulatory authority or authority having jurisdiction (AHJ).

For the four listed items, the Commission authorized CNSC staff (through CMD 00-M25 and its reference, CMD 00-M18) to grant approval if, among other things, staff were satisfied that the proposed change or action would not result in:

- an unreasonable risk to the environment or the health and safety of persons,
- an unreasonable risk to national security, or
- a failure to achieve conformity with measures of control and international obligations to which Canada has agreed

Changes that are within the licensing basis and do not require CNSC staff authorization may still require notification. See LC G.2 for further information on notification to CNSC staff of changes to safety and control measures.

In the event of any real or perceived inconsistency or conflict between elements of the licensing basis, the licensee is expected to consult CNSC staff for resolution. In the event of a conflict between CSA standards, the licensee is expected to consult with CSA Group to aid in its resolution.

In the event that the Commission grants approval to operate in a manner that is not in accordance with the previously established 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.

Compliance Verification Criteria

Part (i) of the licensing basis, includes, but is not limited to, the following:

- Nuclear Safety and Control Act
- Regulations made by the CNSC
- Canada/IAEA Safeguards Agreement

Parts (ii) and (iii) of the licensing basis refer to safety and control measures described in the licence, the documents directly referenced in that licence, the licence application and the documents needed to support that licence application. Safety and control measures are provisions to meet the purpose of the NSCA - in particular, to prevent unreasonable risk associated with the licensed activity or facility, including:

- programmatic elements
- engineering barriers and controls
- administrative and operational barriers and controls
- mitigating measures

Safety and control measures can be identified in licensing basis publications that are cited in the licence and the licence application. Safety and control measures can also be identified in programmatic licensee governance or supporting licensee documentation. The licensee documents and relevant licensing basis publications may, in turn, cite other documents and publications that also establish safety and control measures.

The applicable versions of 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 CVC unless stated otherwise.

LC G.1 requires the licensee to implement the safety and control measures identified in the licensing basis. Note, however, that not all details in referenced documents are necessarily considered to be safety and control measures. Details (even if in normative format) that are irrelevant to safety and control measures for facilities or activities authorized by the licence are excluded from the CVC of LC G.1.

The licensee may propose alternate approaches to implement safety and control measures already identified in the licensing basis. The licensee shall assess changes to confirm that licensed activities remain in accordance with the licensing basis and the proposed changes. In addition, for staff authorizations, the licensee shall carry out any other assessments or determinations identified in the requirements associated with the staff authorization. When it cannot be confirmed that the change is in accordance with the licensing basis, the licensee shall seek prior approval of the Commission for the change.

For 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. The licensee shall report these situations to CNSC; see LC 3.3.

The licensee's safety and control measures are described in the following documentation provided at the time of the licence application, or in support of thereafter:

Date	Document Title	Document #	E-Doc #
December 13, 2013	Darlington NGS - Application for Renewal of Darlington Nuclear Generating Station Power Reactor Operating Licence 13.00/2014	NK38-CORR-00531-16490	4261350
May 1, 2014	Darlington NGS- Updated Application Requirements for Renewal of the Darlington Nuclear Generating Station Power Reactor Operating Licence- Transition Plans for New and Revised Standards and Regulatory Documents	NK38-CORR-00531-16780	4429709
January 30, 2015	Darlington NGS- Additional information in Support of Application for Renewal of Darlington's Power Reactor Operating Licence (PROL) 13.01/2015	NK38-CORR-00531-17206	4635419

Recommendations and Guidance

CNSC REGDOC-1.1.3, Licence Application Guide: Licence to Operate a Nuclear Power Plant, describes a wide, but not necessarily exhaustive, range of safety and control measures that may be relevant to an operating nuclear power plant. In Version 1.2 of REGDOC-1.1.3, Section 4 discusses these measures for each of the 14 SCAs, while Section 5 discusses some safety and control measures that may be associated with other matters of regulatory interest that do not fall within the 14 SCAs.

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 *Assessment of licensee changes to documents or operations* [e-Doc 4055483]. Such criteria would also be used if the change requires CNSC staff authorization.

When the licensee is unsure if a proposed change or activity is in accordance with the licensing basis, it can consult CNSC staff. 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 LCs in this LCH. Guidance for notifications to the CNSC related to licensee changes is discussed under LC G.2.

G.2 Notification of Changes

Licence Condition G.2:

The licensee shall give notification of changes to the facility's safety and control measures that impact the licensing basis.

Preamble

The safety and control measures subject to this notification are part of the licensing basis as described in LC G.1. Facility-specific safety and control measures are identified in the licensee documents listed in the CVC of this LCH. Current versions of the licensee documents listed in this LCH that require notification of change are recorded in CNSC document "OPG - Darlington NGS PROL Written Notification Documents in LCH" (e-Doc 3959167).

A notification is defined as a formal, recorded communication from the licensee to CNSC staff.

Licensee documents tabulated in the CVC of the LCH have different requirements for notification of change, depending on their significance. Some documents will require notification prior to a change being implemented (denoted as "PI" in the CVC tables) and others will require notification at the time of implementation (denoted as "TI" in the CVC tables).

Compliance Verification Criteria

Compliance with this LC includes notification of changes to the licensee documents listed under CVC of all LCs in this LCH.

For any planned change for which it is not immediately obvious that the change will be in accordance with the licensing basis, the licensee shall opt for disclosure and notify CNSC staff prior to implementing the change.

Notifications shall include a summary description of the change, the rationale for the change, expected duration (if not a permanent change), and a summary explanation of how the licensee has concluded that the change remains in accordance with the licensing basis. The licensee shall provide enough information and time to review to facilitate CNSC staff's confirmation that the change remains in accordance with the licensing basis. This may include, for example, providing copies of references in the licensee document that are either changing or are pertinent to the change in the licensee document. Changes for which that conclusion is not obvious require further assessment of impact to determine if Commission approval is required in accordance with LC G.1.

For licensee documents designated as PI, the licensee shall submit the document to the CNSC prior to implementing changes. The licensee shall allow sufficient time for the CNSC to review the change proportionate to its complexity and the importance of the safety and control measures being affected. Typically, most changes require submission a minimum of 30 days prior to planned implementation. For documents designated as TI, the licensee need only submit the revised document at the time of implementing the change.

OPG shall follow its process OPG-PROG-0001, *Information Management*, for any changes related to a document listed in Appendix D.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Information Management	OPG-PROG-0001	TI

Recommendations and Guidance

Appendix A of *Assessment of licensee changes to documents or operations* [e-Doc 4055483] identifies some factors that could be addressed to confirm that a change remains in accordance with the licensing basis. For proposed changes that may not be in accordance with the licensing basis, the Guidance for LC G.1 applies.

The following scenarios, not necessarily mutually exclusive, are examples of changes that merit notification:

a) The licensee plans to make changes to the facility or its operation, such as deviations from design, operating conditions, policies, programs or methods, and such changes are not explicitly permitted in the licensee's governance or other parts of the licensing basis.
b) The licensee requires staff authorization (see description under CVC of LC G.1) for a planned change. The specific requirements for such notifications may be identified in the part of the licensing basis that establishes the basis for the staff authorization.
c) The licensee plans to implement a new or revised regulatory document or industry standard. The notification would typically indicate the date by which implementation of the publication will be complete and describe any corresponding changes needed for implementation.

The following are two examples (in no way do they form a representative or exhaustive list) that are illustrative of changes in scenario a). These examples would not necessarily result in a change in a document identified in the LCH requiring notification of change.

- The licensee is changing certain responsibilities of a worker that could have a significant impact on emergency response.
- The licensee is planning a significant plant modification.

When in doubt, the licensee should opt for providing notification of a change.

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 *General Nuclear Safety and Control Regulations* require that a licence application contain a description of the nuclear facility.

The siting guide used at the time of design of all Canadian NPPs (AECB-1059, e-Doc 3000249) stipulated an exclusion zone that extended at least 914 metres (3000 feet) from the exterior of any reactor building.

Compliance Verification Criteria

The licensee shall ensure that the use and occupancy of land within the exclusion zone does 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.

The licensee shall notify the CNSC of changes to the licence agreement with the Municipality of Clarington, which ensures safe public access to the waterfront trail that traverses the Darlington site.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Darlington NGS-A Plant Survey	LO4254-DZS-10162-0531	PI
Darlington Safety Report Part 1 and 2	NK38-SR-03500-10001	TI
Site and Improvements Site Plan General Arrangement	NK38-D0H-10220-1001	TI
Site Improvements Base Line Plan and Construction Grid	NK38-D0H-10220-1002	TI

LO4254-DZS-10162-0531, *Darlington NGS-A Plant Survey*, NK38-D0H-10220-1001, *Site and Improvements Site Plan General Arrangement,* and NK38-D0H-10220-1002, *Site Improvements Base Line Plan and Construction Grid,* describe the exclusion zone, identifying the parcels of land that are not owned by OPG and provide information on land use. These documents shall be revised to reflect any transfer of land within the exclusion zone to non-licensee ownership. The Plant Survey also appears in NK38-SR-03500-10001, *Darlington Safety Report Part 1 and 2*, which provides added details on the plant and site description.

Recommendations and Guidance

This section has no contents applicable to this LC.

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 (onsite Commission staff).

Preamble

CNSC staff require 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.

Recommendations and Guidance

This section has no contents applicable to this LC.

G.5 Financial Guarantee

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 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 decommissioning and all such costs are included in the decommissioning cost estimates and are covered by licensee's consolidated financial guarantee for decommissioning.

OPG conducted a complete decommissioning cost estimate review as part of the 5-year Ontario Nuclear Funds Agreement reference plan update cycle. Gaps identified between the preliminary decommissioning plan and CSA standard N294-19, *Decommissioning of facilities containing nuclear substances*, that could impact on the decommissioning costs, were addressed by OPG in the cost estimate review.

The financial guarantee is composed of the following components:

- segregated funds established pursuant to the Ontario Nuclear Funds Agreement (ONFA) between the licensee and the Province of Ontario as amended and effective March 1, 2010;
- trust fund for the management of used fuel established pursuant to the *Nuclear Fuel Waste Act*; and
- Provincial Guarantee pursuant to the Provincial Guarantee Agreement between the CNSC and the Province of Ontario, which was amended March 1, 2010.

Compliance Verification Criteria

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.

CNSC REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*, was published in January 2021. As detailed in OPG letter N-CORR-00531-23536 (e-doc 6955238), submissions of financial guarantees for OPG owned facilities will be compliant with REGDOC-3.3.1. The next full update to the 5-year reference plan for financial guarantee purposes is expected in 2027.

The licensee shall submit annually to the Commission a written report confirming that the financial guarantees for decommissioning costs remain valid and in effect and sufficient to meet the

decommissioning needs. The licensee shall submit this report by the end of February of each year, or at any time as the Commission may request.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
NA	CNSC Financial Security and ONFA Access Agreement and Provincial Guarantee Agreement, effective January 1, 2013	N/A	Amended 2013-01-01	2016-01-01
CNSC	Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities	REGDOC-3.3.1	2021	2027-12-30

Recommendations and Guidance

This section has no contents applicable to this LC.

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*, 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.

Compliance Verification Criteria

The licensee shall implement and maintain a program for public information and disclosure. This program shall comply with the requirements set out in CNSC regulatory document REGDOC-3.2.1, *Public Information and Disclosure*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Public Information and Disclosure	REGDOC-3.2.1	2018	2020-12-11

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.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Nuclear Public Information and Disclosure	N-STD-AS-0013	TI

Recommendations and Guidance

It is recommended that OPG submit annually to CNSC staff a report summarizing the events and developments involving OPGs nuclear facilities.

G.7 Indigenous Engagement

Licence Condition G.7:

The licensee shall implement and maintain an Indigenous engagement program.

Preamble

The Darlington site resides on lands in which many Indigenous Nations and communities have a vested interest and rights, lying within the traditional lands and waters of the Michi Saagiig Anishinaabeg, the Gunshot Treaty (1787-88), the Williams Treaties (1923), and the Williams Treaties Settlement Agreement (2018).

A public information and disclosure program is required by the *Class I Nuclear Facilities Regulations*, which requires that licensees describe and maintain a program to inform persons living in the area of the site of the nature and characteristics of the anticipated effects of the activity on the environment, as well as on the health and safety of people. REGDOC-3.2.1 – *Public Information and Disclosure* also specifies that Indigenous Nations and communities should be included as a target audience for the licensee's public information and disclosure program.

As per section 6 of REGDOC-3.2.2 – *Indigenous Engagement*, licensees may be required to continue to engage Indigenous Nations and communities after an Environmental Assessment or licensing decision. Licensees may also be required to update the CNSC about their ongoing Indigenous engagement activities—for example, the status of the implementation and effectiveness of mitigation and accommodation measures.

CNSC staff identified Indigenous Nations and communities who have interests and Indigenous and/or Treaty rights in the area where the Darlington Nuclear Generating Station (Darlington NGS) is located within Section 4.1.1 of CMD 25-H2. The following Indigenous Nations and Communities were identified as having Indigenous and/or Treaty rights where the Darlington NGS is located:

- Alderville First Nation (AFN)
- Curve Lake First Nation (CLFN)
- Hiawatha First Nation (HFN)
- Mississaugas of Scugog Island First Nation (MSIFN)
- Chippewas of Beausoleil First Nation
- Georgina Island First Nation
- Chippewas of Rama First Nation

The following Indigenous Nations and communities were identified as having interest in the Darlington NGS:

- Mohawks of the Bay of Quinte
- Métis Nation of Ontario
- Six Nations of the Grand River
- Mississaugas of the Credit First Nation
- Saugeen Ojibway Nation

For the purposes of this Licence Condition, the term 'identified Indigenous Nations and communities' refers specifically to the Indigenous Nations and communities listed above.

Compliance Verification Criteria

The licensee shall develop an Indigenous Engagement Program (IEP) and submit it for CNSC staff review. The licensee should engage with and seek feedback from the identified Indigenous Nations and communities in the development of the IEP.

The licensee shall develop a Darlington NGS-specific engagement plan that outlines site specific engagement activities, commitments, and definitions, as outlined in this Licence Condition G.7. This Darlington NGS-specific engagement plan must be clearly linked to and aligned with the licensee's corporate-wide IEP. The development of the Darlington NGS engagement plan should be a collaborative process between the licensee and the identified Indigenous Nations and communities and tailored to Indigenous Nation and communities' rights and interests.

The licensee shall conduct ongoing engagement specific to the Darlington NGS throughout the licence period in accordance with the IEP and Darlington NGS engagement plan. This engagement shall be carried out with the identified Indigenous Nations and communities. If an Indigenous Nation and/or community is non-responsive, the licensee shall continue to share information and provide opportunities for engagement, unless the Indigenous Nation and/or community specifically declines the engagement opportunities and requests that OPG stop sharing information regarding the Darlington NGS.

To ensure ongoing engagement, the licensee shall collaborate and engage with the identified Indigenous Nations and communities on the following commitments:

1. Demonstrate efforts to collaborate with Indigenous Nations and communities to identify and implement approaches to engagement and communication that takes into consideration the knowledge, needs, preferences and interests of each Indigenous Nation and community.
2. Provide knowledge sharing opportunities such as site visits, workshops and information sessions or as interest is expressed by Indigenous Nations and communities.
3. Provide opportunities for two-way dialogue and collaboration in relation to ongoing operational activities, including but not limited to the following areas: environmental monitoring, emergency management response, scheduled reporting and event reporting.
4. Demonstrate efforts to collaborate with Indigenous Nations and communities on the management of waste from the on-going operations of Darlington NGS.
5. Respond to questions, concerns or comments from Indigenous Nations and communities regarding the Darlington NGS and work collaboratively to reflect feedback and Indigenous Knowledge within the licensee's activities, as appropriate.

In addition to the commitments noted above, specific to the Michi Saagiig Nations of the Williams Treaties First Nations (AFN, CLFN, HFN and MSIFN) the licensee shall:

6. Demonstrate efforts to collaborate with AFN, CLFN, HFN and MSIFN to incorporate the outcomes of the Indigenous Knowledge Study (IKS), led by AFN, CLFN, HFN and MSIFN related to the Darlington site into ongoing oversight and monitoring of the Darlington NGS throughout the licensing period, as appropriate.
7. Hold at least semi-annual meetings to share operational updates, safety data, and environmental monitoring results.
8. Demonstrate efforts to collaborate with AFN, CLFN, HFN and MSIFN to incorporate the outcomes of assessments and studies relevant to the Darlington NGS into ongoing oversight and monitoring of the Darlington NGS throughout the licensing period, as appropriate.

Until the IEP is implemented, CNSC staff verification of items 1 through 8 will be performed on a case-by-case basis, following the licensee's establishment of descriptions for these engagement activities within the Darlington NGS-specific engagement plan. The descriptions of these engagement activities should be a collaborative process between the licensee and the identified Indigenous Nations and communities.

Reporting Requirements

The licensee shall submit to the CNSC, an annual report, submitted by May 1st, on the engagement activities it has undertaken with the identified Indigenous Nations and communities. The development of the annual report should be a collaborative process between the licensee and the identified Indigenous Nations and communities. The licensee should also provide a copy of the summary to each Indigenous Nation or community engaged in advance or at the same time it is filed with the CNSC. It is acknowledged that an Indigenous Nation or community may share information with the licensee in confidence. The licensee should work with the Indigenous Nation or community to ensure this information is not disclosed and the Indigenous Nation or community is comfortable with the level of detail communicated within the report.

The annual report shall describe:

- The name of the Indigenous Nation or community.
- The method(s), date(s), location(s), and topics of engagement activities with the Indigenous Nation or community.
- An update on the commitments (items 1 through 8 above) along with any relevant information and context regarding the status of, timelines, and progress made on the initiatives and commitments.
- A summary of any issues, interests, or concerns raised, including those in relation to any potential impacts on identified or established Indigenous and/or Treaty rights.
- The measures taken, or that will be taken, to address or respond to the issues or concerns. Alternatively, an explanation as to why no further action is required to address or respond to issues or concerns shall be provided.
- A description of any changes to project activities and/or programs to address and incorporate the measures taken to respond to issues or concerns, or to incorporate knowledge and feedback from Indigenous Nations and communities.
- The status of OPG's Indigenous Relations Policy initiatives.

- The status of development and implementation of the corporate-wide IEP.
- The status of development and implementation of the Darlington NGS-specific engagement plan.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Public Information and Disclosure	REGDOC-3.2.1	2018	2020-12-11

The following documents require written notification of change:

Document Title	Document #	Notification Status
Indigenous Relations Policy	OPG-POL-0027	TI

Recommendations and Guidance

In conducting its engagement activities, the licensee should consider the guidance provided throughout REGDOC-3.2.2, *Indigenous Engagement, version 1.2 (2022)*.

1 SCA – MANAGEMENT SYSTEM

The safety and control area "Management System" 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.

Performance Objective(s)

There is an effective management system that integrates provisions to address all regulatory and other requirements to enable the licensee to achieve its safety objectives, continuously monitor its performance against those objectives and maintain a healthy safety culture.

1.1 Management System Requirements

Licence Condition 1.1:

The licensee shall implement and maintain a management system.

Preamble

The *General Nuclear Safety and Control Regulations* require that a licence application contain information related to the organizational management structure and responsibilities.

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed quality assurance program.

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 standard N286, *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.

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 of paramount consideration in implementation of the management system. An adequately established and implemented management system provides CNSC staff confidence and evidence that the licensing basis remains valid.

Compliance Verification Criteria

The licensee shall implement and maintain a management system. This management system shall comply with the requirements set out in CSA standard N286, *Management system requirements for nuclear facilities*.

The licensee shall ensure that the management system meets the requirements of CSA N286 at all times throughout operation, refurbishment and return to service for all units.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	Management system requirements for nuclear facilities	N286	2012 (Reaffirmed 2022)	2016-01-01
CNSC	Management Systems	REGDOC-2.1.1	2019	2024-09-27
CNSC	Safety Culture	REGDOC-2.1.2	2018	2023-11-24

Management System

The management and operation of OPG nuclear facilities is defined by the programs and associated nuclear governing documents as described in N-CHAR-AS-0002, *Nuclear Management System*. The management system documentation shall contain sufficient detail to demonstrate that the described processes stated directly or by reference, provides the needed direction to comply with the conditions stated in the PROL and the criteria herein.

Organization

The licensee shall document the organizational structure for safe and reliable conduct of licensed activities and shall include all positions with responsibilities for the management and control of the licensed activity. OPG's organization is defined by N-STD-AS-0020, *Nuclear Management Systems Organizations*, OPG's role documents for certified positions and OPG correspondence "*Persons Authorized to Act on Behalf of OPG in Dealings with the CNSC*".

Safety Culture

Licensees 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. The licensee's approach to worker safety is governed by OPG-PROG-0005, *Environment Health and Safety Managed Systems*, which defines the overall process for managing safety and the responsibilities of the parties, specifically at the corporate level.

A safety culture self-assessment methodology is developed following a continuous improvement process, which is governed by N-PROC-AS-0077, *Nuclear Safety & Security Culture Assessment*.

Business Continuity

Business continuity is addressed in N-GUID-09100-10000, *Contingency Guideline for Maintaining Staff in Key Positions When Normal Station Access is Impeded*, which provides a strategic plan for safe shutdown and follow-up activities in the event of labour disruptions, and OPG-PROG-0033, *Business Continuity Program*. These are also key documents in support of the minimum shift complement (see LC 2.2).

The following documents require written notification of change:

Document Title	Document #	Notification Status
Management System		
Nuclear Management System	N-CHAR-AS-0002	PI
Nuclear Management System Administration	N-PROG-AS-0001	TI
Information Management	OPG-PROG-0001	TI
Project Management	OPG-PROG-0039	TI
Construction Management	OPG-PROG-0046	TI
Managing Change	OPG-STD-0140	TI
Organization		
Nuclear Management Systems Organizations	N-STD-AS-0020	TI
Organization Design Change	OPG-PROC-0166	TI
Plant Management (including Safety Culture)		
Nuclear Safety & Security Policy	N-POL-0001	TI
Nuclear Safety Oversight	N-STD-AS-0023	TI
Environment Health and Safety Managed Systems	OPG-PROG-0005	TI
Nuclear Safety & Security Culture Assessment	N-PROC-AS-0077	TI
Independent Assessment	N-PROG-RA-0010	TI
Contingency Guideline for Maintaining Staff in Key Positions When Normal Station Access is Impeded	N-GUID-09100-10000	TI
Business Continuity Program	OPG-PROG-0033	TI
Items and Services Management	OPG-PROG-0009	TI

Recommendations and 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.

2 SCA – HUMAN PERFORMANCE MANAGEMENT

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

Performance Objective(s)

The licensee has an integrated approach to managing human performance so that all workers have the necessary knowledge, skills and attributes, are fit for duty, are sufficient in number, and are supported to carry out their work tasks safely.

2.1 Human Performance Program

Licence Condition 2.1:

The licensee shall implement and maintain a human performance program.

Preamble

Human performance relates to reducing the likelihood of human error in work activities. It refers to the outcome of human behaviour, functions and actions in a specified environment, reflecting the ability of workers and management to meet the system's defined performance under the conditions in which the system will be employed.

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, and organization and job design may affect the reliability of humans performing tasks under various conditions.

The *General Nuclear Safety and Control Regulations* require different elements related to the human performance program.

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" (LC 8.1).

Compliance Verification Criteria

In order to establish, maintain and improve human performance, the licensee shall monitor and control the work hours and shift schedules of nuclear workers, in accordance with governance N-PROC-OP-0047, *Hours of Work Limits and Managing Worker Fatigue*. All workers performing safety related tasks or working on safety-related systems are subject to these hours of work and scheduling limits.

The licensee shall also monitor and control the fitness for duty of its workers at all times by implementing and maintaining their "Continuous Behaviour Observation Program", N-CMT-62808-00001, which covers aspect related to fitness for duty. Specific fitness for duty requirements for certified personnel can be found in CNSC regulatory document REGDOC-2.2.3, *Personnel Certification, Volume III: Certification of Reactor Facility Workers, version 2*, 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*.

REGDOC-2.2.4 *Fitness for Duty, Volume II: Managing Alcohol and Drug Use Version 3*, published in January 2021, sets out requirements and guidance for managing the fitness for duty of workers in relation to alcohol and drug use and abuse. As detailed in CNSC letter e-Doc 5969253, CNSC staff accepted OPG's implementation timeline set out in OPG correspondence N-CORR-00531-19643 (e-Doc 5865465). In its letter of 28 January 2022 (N-CORR-00531-22958, e-Doc 6728014), OPG has indicated it is in compliance with all REGDOC-2.2.4 Vol II requirements, with the exception of pre-placement and random alcohol and drug testing. OPG has committed to providing further details of its implementation of the remaining portions of REGDOC-2.2.4 Vol II once a decision has been rendered.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Personnel Certification, Volume III: *Certification of Reactor Facility Workers*	REGDOC-2.2.3	2023 (Version 2)	2025-02-07
CNSC	Fitness for Duty: Managing Worker Fatigue	REGDOC-2.2.4	2017	2019-01-01
CNSC	Fitness for Duty, Volume II: Managing Alcohol and Drug Use	REGDOC-2.2.4	2021 (Version 3)	2021-07-22*
CNSC	Fitness for Duty, Volume III Nuclear Security Officer Medical, Physical, Psychological Fitness	REGDOC-2.2.4	2018	2020-12-31

* For all requirements other than pre-placement and random alcohol and drug testing

The following documents require written notification of change:

Document Title	Document #	Notification Status
Hours of Work Limits and Managing Worker Fatigue	N-PROC-OP-0047	PI
Listing of Broad Population and Safety Sensitive Job Codes	N-LIST-09110-10005	PI
Human Performance	N-PROG-AS-0002	TI
Procedure Use and Adherence	N-STD-AS-0002	TI
Communications	N-STD-OP-0002	TI
Self-Check	N-STD-OP-0004	TI
Conservative Decision Making	N-STD-OP-0012	TI
Second Party Verification	N-STD-RA-0014	TI
Pre-Job Brief / Safe Work Plan and Post-Job Debriefing	N-PROC-OP-0005	TI
Continuous Behaviour Observation Program (CBOP) – Participants Materials – Workbook Components	N-CMT-62808-00001	TI
Fitness For Duty: Policy On Managing Alcohol and Drug Use	OPG-PROC-0208	TI

Recommendations and Guidance

Licensees should implement a program that continuously monitors human performance, takes steps to identify human performance weaknesses, improves human performance, and reduces the likelihood of human performance related causes and root causes of nuclear safety events.

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
  - Fitness for duty
    - Hours of Work
    - Fatigue Management
- The reduction of human error
  - HF in Design
  - Procedures Development
  - Procedural Compliance
  - Work protection and Work Permit Systems
  - Shift Turnover
  - Pre and Post Job Briefings
  - Safe work strategies/practices
- Organizational support for safe work activities
  - Human Actions in Safety Analysis
  - Organizational Performance and Safety culture
- The continuous improvement of human performance

Additional guidance is provided in CNSC regulatory document REGDOC-2.5.1, *General Design Considerations: Human Factors*.

2.2 Minimum Shift Complement

Licence Condition 2.2:

The licensee shall implement and maintain the minimum shift complement and control room staffing.

Preamble

The *General Nuclear Safety and Control Regulations*, require that the licensee ensure the presence of a sufficient number of qualified workers at the nuclear facility.

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 ensures the presence of a sufficient number of qualified workers who must be present at all times to ensure safe operation of the nuclear facility, and to ensure adequate emergency response capability.

Compliance Verification Criteria

Minimum Shift Complement

The licensee's minimum shift complement (MSC) documentation, D-PROC-OP-0009, *Station Shift Complement*, 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 violations until minimum complement requirements are restored.

The licensee shall operate the nuclear facility in accordance with these documents and shall monitor and keep records of each shift's complement. The licensee shall provide a rolling five year profile of certified operators on an annual basis.

The MSC is considered part of the licensing basis. Changes to the MSC are subject to LC G.1. The following tables summarize the facility's MSC. These tables are taken from D-PROC-OP-0009. 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 its own change control process).

Shift Complement by Work Group (Normal Operation)

Operations Work Group Minimum Complement

Position	Minimum Complement # (3 Units Fueled)	Minimum Complement # (4 Units Fueled)	Scheduled Complement #
Authorized Nuclear Operators (ANO)	5 (7)	6 (7)	7
Unit 0 Control Room Operators (CRO)	2	2	2
Field Shift Operating Supervisor (FSOS)	1	1	1
Unit 0 Nuclear Operators	3	3	3
Nuclear Operators (NO) (Units 1 – 4)	11 (7)	10 (7)	12
Shift Manager (SM)	1	1	1
Control Room Shift Supervisor (CRSS)	1	1	1
Supervising Nuclear Operators (SNO)	4	4	4
Unit 0 Field Supervising Nuclear Operator	1	1	1
Operations Sub-Total	**29**	**29**	**32**

Other Work Groups Minimum Complement

Work Group	Position	Minimum Complement #				Scheduled Complement #			
TRF	Control Room SNO	1				1			
TRF	Major Panel Operator (MPO)	1				1			
TRF	Nuclear Operators	2 (1)				2 (1)			
Lab	Chemical Technician	2				2			
FP	Emergency Response Maintainer (ERM)	6				6			
FP	Shift Emergency Response Manager (SERM)	1				1			
Maint	FLM – Control	1				1			
Maint	Shift Control Technician (SCT) (3) (4)	2 [1]				3 [2]			
Maint	Mechanical Maintainer (3)	1 [0]				2 [0]			
Maint	FH Mech. Maintainer/Control Technician (4)	1 [0]				2 [0]			
Maint	FLM – FH (4)	1 [0]				1 [0]			
Security	Nuclear Security Officer (NSO)	NS (5)				NS (5)			
Number of FH Trolleys Operated (6)		0	1	2	3	0	1	2	3
FH	Field Shift Operating Supervisor	0	0	0	0	0	1	1	1
FH	Supervising Nuclear Operator (2)	1	1	1	1	1	1	1	1
FH	Major Panel Operator (2)	0	1	2	3	0	1	2	3
FH	Nuclear Operator (2)	1	2	2	2	2	2	2	3
Other Work Groups Sub-Total (4)		22 [18]	24 [20]	25 [21]	26 [22]	26 [21]	28 [23]	29 [24]	31 [26]
All Work Groups (including Operations) Total (4)		52 [48]	54 [50]	55 [51]	56 [52]	59 [54]	61 [56]	62 [57]	64 [59]

(1) TRF Nuclear Operators minimum and scheduled complements are reduced to 1 during TRF outage (i.e. hydrogen, deuterium and tritium inventories have been removed from the TRF process). Default complement is 2 (TRF in service).

(2) The workgroup minimum complement for Fuel Handling is one (1) SNO and one (1) Nuclear Operator, when no trolleys are being operated. However, the station strives to staff to allow for one trolley to be operated (1 SNO, 1 MPO and 2 NO's).

(3) One SCT has Design Basis Accident response duties while FH Operations staff (or other qualified staff as per N-PROC-MA-0012) assist with PPT verification (refer to N-INS-03490-10003 for details on credited response to Loss of Instrument Air event and PHT LRV Fail Open event).

(4) Night shift complement, where different from days, shown in square brackets [ ].

(5) NS = not specified in this document – security protected. Refer to Site Security Report.

(6) For the purposes of MCCP alarm limits, complement numbers for 1 trolley operation are used.

(7) When a reactor unit is in a defueled state the minimum complement of certified ANOs required to be present in the facility is reduced to five (5) and the minimum complement of Nuclear Operators for units 1-4 is increased to 11. The number of NOs is increased in order to provide a second emergency MCRA (CSP) qualified operator as per the following table: ERO Requirements (for emergency conditions) Notation 8. Any certified ANO surplus to minimum complement can also fill this role.

Shift Complement for Emergency Response Organization (ERO)

ERO Requirements (for emergency conditions)

Position	Work Group [1]	Minimum Complement #	Scheduled Complement #
Authorized Nuclear Operators (ANO)	Operations	6 [8]	7
Unit 0 Control Room Operator (CRO)	Operations	2	2
Chemical Technician	Chemistry	2	2
Crew Accounting Supervisor	Fuel Handling	1	1
Emergency MCRA (CSP Monitor)	Operations	1 [8]	1
Emergency Response Maintainer (ERM)	Fire Protection	6	6
Emergency TRF Operator	TRF	1	1
Emergency Unit Operator (Units 1–4)	Operations	5	5
EPGQO - Unit 0 Nuclear Operators/FSNO [2]	Operations	3	3
In-Plant Survey Team	Operations	2	3
In-Plant Coordinator	Operations	1	1
Off-Site Survey Team Captain [3]	Maintenance	1 [0]	1 [0]
Off-Site Survey Team [3]	Maintenance	2 [0]	2 [0]
Out-of-Plant Coordinator [3]	Maintenance	1 [0]	1 [0]
Emergency Shift Assistant (ESA)	Operations	1	1
Shift Emergency Response Coordinator	Fire Protection	1	1
Shift Manager [4]	Operations	1	1
Control Room Shift Supervisor (CRSS)	Operations	1	1
Shift Resource Coordinator	Maintenance	1	1
TRF SNO	TRF	1	1
TRF Major Panel Operator	TRF	1	1
Supervising Nuclear Operator (Units 1–4)	Operations	4	4
Mechanical Maintainer [7] – DBA action	Maintenance	1	1
Shift Control Technician [7] – DBA action	Maintenance	1	1
Security [5]	Security	NS [6]	NS [6]
Total		**47 [44]**	**49 [45]**

(1) To ensure the assignment of ERO roles is managed, the assignment of staff by each Work Group is identified in the above table. Nevertheless, these positions may be filled by staff from any work group provided they are qualified and incremental to the roles that are Work Group specific.

(2) The Unit 0 complement requirements for a Main Steam Line Break or a Common Mode Event are one (1) EPGQO and two (2) Unit 0 NO's. In order to facilitate tracking of the EPG Qualified Operators and the Unit 0 NO's together in the Minimum Complement Coordination Program, the station shall continue to ensure that all Unit 0 NO's are EPG qualified. They are to be available to restore EPS/ESW to all affected units within 30 minutes.

(3) Day shift only position (12 hours/day, 7 days/week). Night shift complement, where different from days, shown in square brackets [ ].

(4) The Shift Manager executes both the emergency Shift Manager role and the ERM role until such time as the Site Management Center is declared operational.

(5) Security shall provide two drivers for the Off-Site Survey Team.

(6) NS = not specified in this document – security protected. Refer to Site Security Report.

(7) One MM and one SCT have Design Basis Accident response duties (refer to N-INS-03490-10003 for details on credited MM/CM response to Loss of Instrument Air event and PHT LRV Fail Open event).

(8) When a reactor unit is in a defueled state, the minimum complement of certified ANOs required to be present in the facility is reduced to five (5) and the minimum complement of Emergency MCRAs (CSP Monitors) is increased to two (2) to maintain overall Operations minimum complement unchanged. Any certified ANO surplus to minimum complement can also fill the role of emergency MCRA.

Control Room Staffing

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 2.3.

In conjunction with the minimum shift complement for the facility, the licensee shall maintain adequate control room staffing. For the following certified positions, the licensee shall have the following certified personnel at all times:

(i) in the nuclear facility, at least one certified shift manager, one certified control room shift supervisor, two certified unit 0 control room operators, and the following number of authorized nuclear operators for the specified number of reactor units with fuel in the core.

  (a) Five authorized nuclear operators for three fueled units; and

  (b) Six authorized nuclear operators for four fueled units.

(ii) in the main control room, at least the following number of certified authorized nuclear operators for the specified number of reactor units with fuel in the core:

  (a) Three authorized nuclear operators for three fueled units; and

  (b) Four authorized nuclear operators for four fueled units.

(iii) in the main control room, at least one certified unit 0 control room operator, except for brief absences to determine the origin of fire alarms.

(iv) in the main control room, a certified authorized nuclear operator in direct attendance at the control panels of each reactor unit with fuel in the core.

The minimum certified 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(s) 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, as described in D-PROC-OP-0009, *Station Shift Complement*.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Station Shift Complement	D-PROC-OP-0009	PI
Duty Crew Minimum Complement Assurance	D-INS-09260-10001	PI

Recommendations and Guidance

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.

Recommendations and guidance for the development and validation of the minimum shift complement are provided in the following CNSC guidance documents:

- REGDOC-2.2.5, Minimum Shift 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.
- 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.

2.3 Personnel Training

Licence Condition 2.3:

The licensee shall implement and maintain training programs for workers.

Preamble

The *General Nuclear Safety and Control Regulations* require the licensee to train the workers to carry on the licensed activity in accordance with the *Nuclear Safety and Control Act*, the associated regulations and the licence.

The *Class I Nuclear Facilities Regulations* requires that:

- A licence application to operate a Class I nuclear facility contain the proposed responsibilities of and qualification requirements and training program for workers, including the procedures for the requalification of workers; and
- The licensee submits the necessary information for certification or renewal of certification of the applicable positions.

Compliance Verification Criteria

The licensee shall implement and maintain programs for training of personnel. The licensee shall implement and maintain initial and continuing training programs for all workers in accordance with CNSC regulatory document REGDOC-2.2.2, *Personnel Training, Version 2*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Personnel Training, Version 2	REGDOC-2.2.2	2016	2024-03-19

The licensee shall implement and maintain an overall training policy, including initial and continuing training sub-programs for all workers. The program shall be based on long-term qualifications and competencies required for job performance, as well as training goals that acknowledge the critical role of safety.

Training Programs for All Workers

As defined by the *General Nuclear Safety and Control Regulations*, a worker is a person who performs work that is referred to in a licence. Workers include contractors and temporary employees; therefore, training requirements apply equally to these types of workers as to the licensee's own employees.

This licence condition provides the regulatory requirements for the development and implementation of training programs for workers. It also provides the requirements for training programs and processes

necessary to support responsibilities, qualifications and requalification training of persons at the nuclear facility.

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).

The following documents require written notification of change:

Document Title	Document #	Notification Status
Training	N-PROG-TR-0005	TI
Systematic Approach to Training	N-PROC-TR-0008	TI

Recommendations and Guidance

This section has no contents applicable to this LC.

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 REACTOR FACILITY WORKERS, VERSION 2. Workers who began an applicable initial training program in accordance with the requirements outlined in REGDOC-2.2.3, Personnel Certification, Volume III: Certification of Persons Working at Nuclear Power Plants, before January 31, 2025, may continue to be certified under requirements of this version until January 31, 2030.

Persons appointed to the following positions require certification:

(i) Responsible Health Physicist;
(ii) Shift Manager;
(iii) Control Room Shift Supervisor;
(iv) Authorized Nuclear Operator; and
(v) Unit 0 Control Room Operator.

Preamble

This LC provides the regulatory requirements for the programs and processes to be implemented in support of the certification and the renewal of the certification of workers employed in designated positions, including those related to initial and continuing training, certification examinations, and requalification testing.

The licensee's governance describes the roles and responsibilities of workers employed in designated positions.

Compliance Verification Criteria

The licensee shall ensure that workers employed in designated positions at the nuclear facility hold a valid certification duly issued by the CNSC for the position to which they have been appointed.

The licensee shall implement and maintain effective qualification and requalification programs in support of the certification, and the renewal of the certification, of workers employed in the positions designated in the licence in accordance with the requirements and guidance set out in CNSC regulatory document REGDOC-2.2.3, *Personnel Certification, Volume III: Certification of Reactor Facility Workers.*

The initial and continuing training programs implemented in support of personnel certification shall also comply with the requirements and guidance set out in CNSC regulatory document REGDOC-2.2.2, *Personnel Training.*

The roles and responsibilities of the designated positions are considered safety and control measures. Any changes to the associated documentation will be reviewed by CNSC staff to confirm said roles and responsibilities remain within the licensing basis, in consultation with a the appropriate designated officer authorized to certify and decertify persons referred to in sections 9 and 12 of the *Class I Nuclear Facilities Regulations*. The general criteria for reviewing changes include those described in Appendix

A.4. Any changes outside the licensing basis would require prior written approval of the Commission, per LC G.1.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Personnel Training	REGDOC-2.2.2	2016 (Version 2)	2024-03-19
CNSC	*Personnel Certification, Volume III:* Certification of Reactor Facility Workers	REGDOC-2.2.3	2023 (Version 2)	2025-02-07

Conduct of Examinations and Tests for Certified Personnel

Currently, the following three CNSC documents contain the requirements and guidance for administering the certification examinations and requalification tests required by REGDOC-2.2.3, Volume III:

- CNSC-*EG1, Rev.0: Requirements and Guidelines for Written and Oral Certification Examinations for Shift Personnel at Nuclear Power Plants*,
- CNSC-*EG2, Rev.0: Requirements and Guidelines for Simulator-based Certification Examinations for Shift Personnel at Nuclear Power Plants*, and
- CNSC document: *Requirements for the Requalification Testing of Certified Shift Personnel at Nuclear Power Plants, Revision 2.*

Under a pilot program approved by CNSC staff (e-Doc 6352433), OPG may choose to administer the General Written Initial Certification Examinations (specified in CNSC-EG1) using Multiple Choice Question (MCQ) format. During this pilot program, the development, conduct, and marking of MCQ General initial certification examinations shall be in accordance with the following OPG document(s):

- N-INS-08920-10004, Written and Oral Initial Certification Examination for Shift Personnel

The following documents require written notification of change:

Document Title	Document #	Notification Status
Training	N-PROG-TR-0005	TI
Systematic Approach to Training	N-PROC-TR-0008	TI
Written and Oral Initial Certification Examination for Shift Personnel	N-INS-08920-10004	PI
Simulator-Based Initial Certification Examinations for Shift Personnel	N-INS-08920-10002	TI
Requalification Testing of Certified Shift Personnel	N-INS-08920-10001	TI
Responsible Health Physicist	N-MAN-08131-10000-CNSC-031	PI

Document Title	Document #	Notification Status
Shift Manager, Darlington Nuclear	N-MAN-08131-10000-CNSC-006	PI
Authorized Nuclear Operator	N-MAN-08131-10000-CNSC-010	PI
Control Room Shift Supervisor – Darlington Nuclear	N-MAN-08131-10000-CNSC-008	PI
Unit 0 Control Room Operator	N-MAN-08131-10000-CNSC-025	PI

Recommendations and Guidance

This section has no contents applicable to this LC.

3 SCA – OPERATING PERFORMANCE

The safety and control area "Operating Performance" includes an overall review of the conduct of the licensed activities and the activities that enable effective performance.

Performance Objective(s)

Plant operation is safe and secure, with adequate regard for health, safety, security, radiation and environmental protection, and international obligations.

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 *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility.

The operations program establishes safe 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; and
- Limits are established in accordance with a Safe Operating Envelope (SOE) are not exceeded.

The OP&Ps:

- Define the operating rules consistent with the safety analyses and other licensing support documentation within which the facility will be operated, maintained and modified, all of which should ensure nuclear safety;
- Specify the authorities of the facility 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.

The SOE is defined in CSA standard N290.15, *Requirements for the safe operating envelope of nuclear power plants*, as "the set of limits and conditions within which the nuclear generating station must be operated to ensure compliance with the safety analysis upon which reactor operation is licensed and which can be monitored by or on behalf of the operator and can be controlled by the operator."

The SOE consists of a number of parameters:

- Safe operating limits;

- Conditions of operability;
- Actions and action times; and
- Surveillances.

The safe operating limits are derived from the safety analysis limits. The SOE parameters are currently identified in various station documents, including Operational Safety Requirements (OSR), Instrument Uncertainty Calculations (IUC), the Abnormal Incidents Manual and surveillance documentation. 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 Analysis assumptions. The magnitude of the initial reactor power, channel powers and bundle powers in the reactor prior to an accident are the fundamental parameters governing whether fuel or fuel channel failure will occur during anticipated transients and the postulated Design Basis Accidents (DBA).

Heat sinks are combination of systems or portions of systems that contribute to conveying heat to the atmosphere or body of water, known as the ultimate heat sink (UHS). The goal of the heat sink systems is to provide heat removal from the heat source (reactor core, pump heat) to the UHS, where the residual heat can always be transferred.

The outage heat sink management defines the strategy to ensure the plant is safe throughout the outage duration when the normal (at high power) heat sinks may not be available. The outage is considered to be terminated when the normal heat sinks are re-established as part of the plan to proceed to sustained high power operation.

Accident management provisions are to ensure effective defences against radiological hazards resulting from DBAs and Beyond Design Basis Accidents (BDBAs). 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.

Compliance Verification Criteria

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. These programs shall comply with the requirements set out in:

- CNSC regulatory document REGDOC-2.3.2, *Accident Management*, Version 2; and
- CSA standard N290.15, *Requirements for the safe operating envelope of nuclear power plants*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	Requirements for the safe operating envelope of nuclear power plants	N290.15	2019	2024-03-19
CNSC	Accident Management	REGDOC-2.3.2	2015 (Version 2)	2023-04-19

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 LC G.1.

Power Limits

In accordance with the Safety Analysis (refer to LC 4.1) and the Licensing Basis (refer to LC G.1), during operation:

- The total power generated in any one fuel bundle shall not exceed the applicable channel-specific bundle power limit as defined in the current licensing submissions under steady-state operating conditions. The maximum value in the channel-specific bundle power limit map is 908.5 kilowatts.
- The total power generated in any fuel channel shall not exceed the applicable channel-specific channel power limit as defined in the current licensing submissions under steady-state operating conditions. The maximum value in the channel-specific power limit map is 7200 kilowatts.
- The total thermal power from the reactor fuel shall not exceed 2776 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 LC G.1.

Operating Policies and Principles

The operating policies and principles shall provide direction 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.

Safe Operating Envelope

The licensee's safe operating limits, conditions and surveillance requirements, as well as their bases are documented in station and system specific OSR documents along with any associated IUCs. The limits and conditions defined in the OSRs, including any requirements for corrective or mitigating actions and action times, are specified in the applicable operations and maintenance tests, procedures and processes to ensure compliance with the SOE.

The licensee shall maintain a set of OSRs and IUCs that define the limits and conditions of the safe operating envelope.

The SOE is considered part of the licensing basis. Any changes to the safety and control measures listed in the SOE documentation (including OSRs and IUCs) require Prior Written Notification, subject to LC G.1 and G.2.

Changes affecting SOE documentation, that are credited through approved Document Change Requests and have resulted in revisions to downstream SOE documentation, require Prior Written Notification, subject to G.2

Accident Management

The licensee shall implement and maintain operational procedures for operation in all states analyzed in the design basis, including abnormal and emergency states.

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 operational scenarios analyzed in the design basis are accounted for in the operational procedures with the purpose of mitigating 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.

In addition to the operational guidance for abnormal and emergency states, the licensee shall implement and maintain a severe accident management program to address residual 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), if a severe accident is detected.

Incorporating lessons learned from world events, OPG has issued a series of emergency operating procedures, the Emergency Mitigating Equipment Guidelines (EMEGs). EMEGS were developed to enable the use of portable diesel pumps and generator to provide coolant inventory make up (to steam generators, moderator and heat transport systems), and electrical power to essential instrumentation. The EMEGs are initiated following a total loss of Class IV and Class III electrical power or a Seismic Event where both Emergency Power Generators fail and cannot be restored, with the intention of preventing a Fukushima type core damage event.

The licensee shall ensure clear instruction is provided directing operations in abnormal scenarios to the appropriate set of procedures or guides.

OPG is compliant with the 2015 version of REGDOC-2.3.2, *Accident Management,* Version 2 as of 19 April 2023.

Other Requirements

All work-related tasks shall be supported by procedures that are fit for purpose and are used appropriately to minimize the potential for human error.
Additionally, the licensee shall maintain a set of technical basis documents describing the design basis for chemistry control.

In addition to the documents listed in the table below, the licensee shall provide WN to CNSC staff prior to implementation, of any changes to any procedures that could potentially impact on the reactor, the channel or the bundle power limits. Changes that would impact these limits are subject to LC G.1.

In 2013, CNSC staff agreed to the implementation of Rod-based Guaranteed Shutdown State as a Guaranteed Shutdown State at Darlington NGS (e-Doc 4192803). In 2019, CNSC staff provided concurrence to OPG's request to extend the applicability of RBGSS for outages up to 375 days in length, without the need to notify CNSC staff (e-Doc 5979625). RBGSS is established through the application of physical barriers and procedural controls guaranteeing that the shut-off absorbers, control absorbers, and adjuster absorber rods remain in-core to ensure a sub-critical reactor status. In addition, to the inserted rods, a concentration of at least 3.3 ppm of Gadolinium Nitrate (Gd) is maintained in the moderator as a "poison" providing additional defence-in-depth. The licensee shall provide prior written notification for changes to operations or procedures for the Rod-based Guaranteed Shutdown State. CNSC staff will use the criteria in Appendix A.4 and any other applicable criteria to confirm the changes remain within the licensing basis. Changes outside of the licensing basis will require prior written approval by the Commission, per LC G.1.

OPG has committed to implementing CSA N290.11-13 (R2019), *Requirements for reactor heat removal capability during outage of nuclear power plants* by 30 September 2025 [CD# NK38-CORR-00531-25642, e-Doc 7372903].

The following documents require written notification of change:

Document Title	Document #	Notification Status
Operating Policies and Principles	NK38-OPP-03600	PI
Safe Operating Envelope	N-STD-MP-0016	PI
Heat Sink Management	N-STD-OP-0025	TI
Nuclear Safety Configuration Management	N-STD-OP-0024	TI
Nuclear Operations	N-PROG-OP-0001	TI
Chemistry	N-PROG-OP-0004	TI
Conservative Decision-Making	N-STD-OP-0012	TI
Operational Decision Making	N-STD-OP-0036	TI
Beyond Design Basis Accident Management	N-STD-MP-0019	PI

Document Title	Document #	Notification Status
Operations Performance Monitoring	N-STD-OP-0011	TI
Operating Experience Process	N-PROC-RA-0035	TI
Processing Station Conditions Records	N-PROC-RA-0022	TI
Performance Improvement	N-PROG-RA-0003	TI
Response to Transients	N-STD-OP-0017	TI
Reactor Safety Program	N-PROG-MP-0014	TI
Reactivity Management	N-STD-OP-0009	TI
Control of Fuelling Operations	N-STD-OP-0021	TI
Darlington Operational Safety Requirements: Emergency Coolant Injection System	NK38-OSR-08131.02-10001	PI
Darlington Operational Safety Requirements: Emergency Service Water System	NK38-OSR-08131.02-10002	PI
Operational Safety Requirements: Fuel and Reactor Physics	NK38-OSR-08131.02-10003	PI
Shutdown Systems	NK38-OSR-08131.02-10004	PI
Darlington Operational Safety Requirements: Main Steam Supply System	NK38-OSR-08131.02-10005	PI
Darlington NGS: Negative Pressure Containment	NK38-OSR-08131.02-10006	PI
Darlington Operational Safety Requirements: Steam Generator Emergency Cooling System	NK38-OSR-08131.02-10007	PI
Darlington NGS Operational Safety Requirements: Moderator System	NK38-OSR-08131.02-10008	PI
Operational Safety Requirements: Powerhouse Steam Venting System	NK38-OSR-08131.02-10009	PI
Operational Safety Requirements: Reactor Regulating System	NK38-OSR-08131.02-10010	PI

Document Title	Document #	Notification Status
Darlington Operational Safety Requirements: Group 1 Service Water Systems	NK38-OSR-08131.02-10011	PI
Darlington NGS Emergency Power Supply System	NK38-OSR-08131.02-10012	PI
Darlington Operational Safety Requirements: Feedwater System	NK38-OSR-08131.02-10013	PI
Darlington Operational Safety Requirements: Shutdown Cooling System	NK38-OSR-08131.02-10014	PI
Darlington Operational Safety Requirements: Heat Transport System	NK38-OSR-08131.02-10015	PI
Darlington NGS: Group 1 Electrical Power Systems	NK38-OSR-08131.02-10016	PI
Darlington Operational Safety Requirements: Toxic Gas Monitoring and MCR Breathing Air	NK38-OSR-08131.02-10017	PI
Darlington NGS Operational Safety Requirements: Fuel Handling System and Irradiated Fuel Bays	NK38-OSR-08131.02-10018	PI
Darlington NGS Operational Safety Requirements: Powerhouse Steam and Flooding Protective Provisions	NK38-OSR-08131.02-10019	PI
Darlington NGS Operational Safety Requirements: Annulus Gas System	NK38-OSR-08131.02-10020	PI
Darlington NGS Critical Safety Parameter Monitoring Instrumentation	NK38-OSR-08131.02-10021	PI
Darlington NGS Operational Safety Requirements: Shield Cooling System	NK38-OSR-08131.02-10022	PI
Darlington NGS ECIS Instrument Uncertainties and Allowable values	NK38-CALC-63432-10001	PI
Darlington NGS SDS1 Instrument Uncertainties and Allowable values	NK38-CALC-68200-10001	PI
Darlington NGS SDS2 Instrument Uncertainties and Allowable values	NK38-CALC-68300-10001	PI

Document Title	Document #	Notification Status
Darlington NPCS Instrument Uncertainties and Allowable values	NK38-CALC-63420-10001	PI
Darlington NGS Steam Generator Emergency Cooling System Instrument Uncertainties and Allowable Values	NK38-CALC-63671-10001	PI
Darlington NGS Moderator System Instrument Uncertainties and Allowable Values	NK38-CALC-63210-10001	PI
Darlington PSVS Instrument Uncertainties and Allowable Values	NK38-CALC-67322-10001	PI
Darlington NGS Reactor Regulating System Instrument Uncertainties and Allowable Values	NK38-CALC-63700-10001	PI
Darlington NGS Feedwater System Instrument Uncertainties and Allowable Values	NK38-CALC-64320-10001	PI
Darlington NGS Shutdown Cooling System Instrument Uncertainties and Allowable Values	NK38-CALC-63341-10001	PI
Darlington HTS Instrument Uncertainties and Allowable Values	NK38-CALC-63330-10001	PI
Darlington NGS Powerhouse Steam and Flooding Protective Provisions Instrument Uncertainties And Allowable Values	NK38-CALC-67320-10001	PI
Darlington NGS Annulus Gas System Instrument Uncertainties and Allowable Values	NK38-CALC-63488-10001	PI
Darlington NGS Critical Safety Parameter Monitoring Instrumentation Uncertainties and Allowable Values	NK38-CALC-60350-10001	PI
Darlington NGS Shield Cooling System Instrument Uncertainties and Allowable Values	NK38-CALC-63411-10001	PI

Recommendations and Guidance

The licensee should manage all outage heat sink work activities in accordance with CSA standard N290.11, *Requirements for heat removal capability during outage of nuclear power plants*.

Additional recommendations and guidance regarding Beyond Design Basis Accidents (BDSAs) are found in CSA standard N290.16, *Requirements for beyond design basis accidents.*

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 and its related definitions are defined, as follows:

- Serious process failure – With respect to CANDU reactor facilities, a failure that leads or that could lead, in the absence of action by any special safety system, to significant fuel damage or a significant release from the CANDU reactor facility.
- Significant fuel damage - An event or situation that brought the fuel (>1%) outside of its fitness for service limits.
- Significant release – A release of radioactive material that results in an effective dose, received by or committed to a typical member of the critical group, in excess of 0.5 millisievert.

The definition of serious process failure can also be found in CNSC regulatory document REGDOC-3.6, *Glossary of CNSC Terminology*. The reporting requirements are also provided in CNSC regulatory document REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*.

As described in Appendix A.1, on Delegation of Authority, Delegation of approval by the Commission, to give consent, applies to the incumbents of the following positions:

- Darlington Regulatory Program Director,
- Director General, Directorate of Power Reactor Regulation, and
- Executive Vice President and Chief Regulatory Operations Officer, Regulatory Operations Branch.

Person(s) authorized have the authority to give the consent to OPG to proceed with the restart of the Darlington NGS reactor if there is sufficient assurance that the following criteria have been met, otherwise, approval to restart must be granted by the Commission:

- Cause of the serious process failure has been resolved;
- Darlington NGS is within the licensing basis;
- Fuel is fit for service; and
- the serious process failure did not exceed a frequency of greater than one per three year rolling period

Compliance Verification Criteria

Serious process failures are reportable in accordance with REGDOC-3.1.1, [LC 3.3]. 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 formal request for restart of

the reactor shall be submitted in writing to the CNSC. In accordance with the licence condition, to restart the reactor, OPG shall obtain approval of the Commission, or the prior written consent of a person authorized by the Commission, depending on the criteria.

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, which shall be completed prior to reactor restart;
- A statement regarding plant readiness to resume safe operation, which 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.

As specified for LC G.1, for 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.

For minor deviations outside the licensing basis, the licensee may use their internal procedures to return to a state consistent with the licensing basis and report the incident to the CNSC through REGDOC-3.1.1 [LC 3.3].

For more significant situations, serious process failures, approval or consent is required before returning to service in accordance with LC 3.2. In such cases systematic and systemic damage to a barrier to the release of radioactivity has or could have occurred.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Operating Policies and Principles	NK38-OPP-03600	PI
Reactor Safety Program	N-PROG-MP-0014	TI
Response to Transients	N-STD-OP-0017	TI

Recommendations and Guidance

In addition to the requirements listed above, the written request to restart a reactor after a serious process failure should also include the following information:

- Documentation and communication to licensee staff addressing the root cause analysis, corrective actions, and plant readiness to resume operation (including additional training, if necessary); and
- Applicable historical Operating Experience (OPEX) review for comparable events (OPEX is further described in LC 1.1).

As the fuel sheath is the barrier that contains the vast majority of the fission products during normal operations, this barrier was selected, with its fitness for service limits as the criteria. Specifically: Sheath Temperatures less than or equal to 450 C; and Sheath Strains less than or equal to 0.5%.

In order to screen out insignificant events, such as individual fuel failure due to debris fretting, a threshold criteria was established of at least 1% of the core or about 50 bundles in the definition for significant fuel damage. If a single component of a bundle is not fit for service (e.g. one pin) then the entire bundle is not fit for service.

A review of the applicable criteria should be performed to ensure the continued operations will remain within the licensing basis, in accordance with Appendix A of CNSC internal document "Overview of assessing licensee changes to documents or operations", e-Doc 4055483 including results of Serious Process Failure Tool screening, e-Doc 7046698.

Relevant guidance publications:

Source	Document Title	Document #	Revision #
CNSC	Nuclear Fuel Safety	REGDOC-2.4.5	April 2024
COG	Principles & Guidelines For Deterministic Safety Analysis, CANDU Owners Group, Safety Analysis Improvement Task Team	COG-09-9030	R03
COG	Fuel and Pressure Tube Fitness-For-Service Criteria for LOF, SBLOCA and Slow LORC	COG-12-2049	July 2015

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: NUCLEAR POWER PLANTS.

Preamble

CNSC regulatory document REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*, has comprehensive reporting requirements (scheduled and unscheduled) for 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.

Compliance Verification Criteria

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Reporting Requirements for Nuclear Power Plants	REGDOC-3.1.1	2016 (Version 2)	2024-03-19

In April 2024, the Commission published REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*, Version 3 (2024). OPG was requested to provide an implementation plan for event reports by 03 February 2025. For the quarterly reports, OPG has committed to begin submitting reports in accordance with REGDOC-3.1.1 version 3 for the reporting period starting in January 2025. For the annual reports, OPG has committed to adapting the 2024 reporting period data that would be reported in 2025 to version 3.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Written Reporting to Regulatory Agencies	N-PROC-RA-0005	TI
Preliminary Event Notifications	N-PROC-RA-0020	TI

Recommendations and Guidance

This section has no contents applicable to this LC.

3.4 Periodic Safety Review

Licence Condition 3.4:

The licensee shall conduct and submit, results of a periodic safety review at least every 10 years.

Preamble

In support of refurbishment activities and continued long term operation, OPG has conducted an Integrated Safety Review in accordance with CNSC regulatory document RD-360, *Life Extension of Nuclear Power Plants*.

An Integrated Safety Review (ISR) is a process which includes an assessment of the current state of the plant and plant performance to determine the extent to which the plant conforms to modern standards and practices, and to identify any factors that would limit safe long-term operation. The process starts with a comprehensive review of the facility and its operations and results in the production of an integrated implementation plan (IIP) which describes practical and reasonable modifications to be carried out by the licensee.

The periodic safety review (PSR) process mirrors this approach. The PSR process requires OPG submittal of a PSR basis document, safety factor reports, a global assessment report and an Integrated Implementation Plan. Per international practice, the appropriate interval between PSRs is considered to be 10 years.

Compliance Verification Criteria

The licensee shall conduct a PSR in accordance with CNSC regulatory document REGDOC-2.3.3, *Periodic Safety Reviews*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Periodic Safety Reviews	REGDOC-2.3.3	2015	2016-01-01

Recommendations and Guidance

When conducting a PSR, the licensee should refer to CSA standard N290.18, *Periodic safety review for nuclear power plants (2017), and IAEA, Specific Safety Guide No. SSG-25 - Periodic Safety Review for Nuclear Power Plants (2013)* for further guidance.

When preparing the subsequent OPG Darlington licence application, OPG should refer to REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant,* and ensure that the application addresses it to the extent practicable. This document provides information that supplements and clarifies the basic requirements of the regulations to assist an applicant in providing a sufficient level of detail in the application. It contains clearly separated references to CNSC REGDOCs and industry codes and standards that an applicant must comply with and those which an applicant is recommended to

address. Additionally, descriptions of the contents of the programs to be submitted are contained in this REGDOC.

4 SCA – SAFETY ANALYSIS

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

Performance Objective(s)

There is demonstration of the acceptability of the frequency and consequences of design-basis and beyond design basis events, and the ability of protective systems and emergency mitigating equipment to adequately control power, cool the fuel and contain or limit any radioactivity that could be released from the plant.

4.1 Safety Analysis Program

Licence Condition 4.1:

The licensee shall implement and maintain a safety analysis program.

Preamble

The *General Nuclear Safety and Control Regulations* require that a licence application contain a description and the results of any analyses performed.

The *Class I Nuclear Facilities Regulations* require, amongst other requirements, that a licence application contain a final safety analysis report, and additional supporting information.

A deterministic safety analysis evaluates the NPP's responses to such events by using predetermined rules and assumptions (conservative or best-estimate methods). The objectives of the deterministic safety analysis (DSA) are stated in CNSC regulatory document REGDOC-2.4.1, *Deterministic Safety Analysis*. DSA allows predicting the extent of potential loads, such as temperatures and pressures, on reactor system and structures in assumed accident scenarios.

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 CNSC regulatory document REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*.

CSA standard N286.7, *Quality assurance of analytical, scientific and design computer programs,* 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.

Compliance Verification Criteria

The licensee shall implement and maintain programs for the development and updates of safety analyses. These programs shall comply with the requirements set out in:

- CNSC regulatory document REGDOC-2.4.1, *Deterministic Safety Analysis*;
- CNSC regulatory document REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*;
- CNSC regulatory document REGDOC-2.4.5, *Nuclear Fuel Safety and Qualification*; and
- CSA standard N286.7, *Quality assurance of analytical, scientific and design computer programs*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Deterministic Safety Analysis	REGDOC-2.4.1	2014	2016-01-01
CNSC	Probabilistic Safety Assessment (PSA) for Nuclear Power Plants	REGDOC-2.4.2	2014	2020-01-01
CNSC	Nuclear Fuel Safety and Qualification	REGDOC-2.4.5	2024	2025-02-20
CSA	Quality assurance of analytical, scientific and design computer programs	N286.7	2016 (Reaffirmed 2021)	2024-09-27

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 CSA N286.7.

Deterministic Safety Analysis

The licensee shall conduct and maintain a deterministic safety analysis as documented in the plant Final Safety Analysis Report. The deterministic safety analysis shall demonstrate that the radiological consequences of the postulated initiating events do not exceed the accident-dependent reference public dose limits in the following table:

	Reference Dose Limit (most exposed member of the public)	
Class of Postulated Event	Thyroid Dose (mSv)	Whole Body Dose (mSv)
Class 1	5	0.5
Class 2	50	5
Class 3	300	30
Class 4	1000	100
Class 5	2500	250

All new analysis will be performed in accordance with REGDOC-2.4.1.

REGDOC-2.4.1 includes modern requirements associated to the lessons learned from the Fukushima nuclear events. OPG has developed an implementation plan which includes undertaking gap identification and prioritization for compliance with REGDOC-2.4.1 to the extent practicable and follows a well-structured approach to identifying, prioritizing and updating analyses, as required. Implementation of REGDOC 2.4.1 is documented in N-PLAN-03500-0500515, *REGDOC-2.4.1 Implementation Plan*, which is revised and submitted to CNSC staff periodically.

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.

The Darlington reactors are designed to standards and regulatory requirements that pre-date the issuing of REGDOC-2.4.1. Where compliance with the requirements (e.g., the single failure criterion (SFC)) cannot be demonstrated by the existing design, the REGDOC-2.4.1 requirements should be applied commensurate with risk, such as permitted in Canadian Standards Association CSA N286-12, recognizing the existing design basis.

These include:

- When demonstrating Level 3 DiD for Design Basis Accidents (DBAs)
    - Apply the SFC by selecting the SFC from the active components that are required to change state for each acceptable criterion.
    - For system availability, sensitivity cases instead of the SFC applying the minimum allowable performance, which accounts for the withdrawal from service of components for limited periods for maintenance, testing, inspection, or repair (MTIR) by selecting components unavailable as assessed in the operational limits and conditions.
- For Anticipated Operating Occurrences (AOOs).
    - Assess operating experience to establish whether the facility had a consequential radioactive release and remains operable.
    - Assess Level 2 system actions, if necessary, using realistic operating conditions.
- For each hazard Postulated Initiating Events, classify credible external events into the AOO, DBA and Design Extension Conditions classes using event-specific standards and guidelines that are consistent with the existing design basis of the plant.

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.

OPG, 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*. These DAC were reviewed and accepted by CNSC staff (e-Doc 4981431) and shall be used by

OPG when conducting deterministic safety analysis.

Additional Requirements

CSA standard N293, *Fire protection for nuclear power plants*, 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. See LC 10.2 for version control of CSA N293.

Probabilistic Safety Assessment

CNSC regulatory document REGDOC-2.4.2 outlines the requirements related to PSA and requires licensees to establish a program for the development and use of PSA as a means to manage radiological risks and to contribute to safe design and operation of reactor facilities.

In accordance with regulatory requirements, OPG shall provide the updated Darlington PSA report and models every 5 years, or sooner if there are significant changes in the plant design or operation. In 2024, OPG submitted the revised PSA methodologies for compliance with REGDOC 2.4.2, Version 2 (2022). The revision included alignment with current REGDOCs, and CSA Guides. CNSC staff concluded that the new and revised Darlington PSA methodologies met the applicable regulatory requirements.

OPG is currently in the process of updating the PSA to the requirements of REGDOC-2.4.2, Version 2. The next Darlington PSA update is expected to be compliant with REGDOC-2.4.2, Version 2, and is due to CNSC staff by 17 December 2025,

The following documents require written notification of change:

Document Title	Document #	Notification Status
Darlington Safety Report Part 1 and 2	NK38-SR-03500-10001	TI
Darlington Nuclear 1-4 Safety Report: Part 3- Accident Analysis	NK38-SR-03500-10002	TI
Darlington Analysis of Record	NK38-REP-00531.7-10001	TI
Beyond Design Basis Accident Management	N-STD-MP-0019	PI
Reactor Safety Program	N-PROG-MP-0014	TI
Safety Analysis Basis and Safety Report	N-PROC-MP-0086	TI
Risk and Reliability Program	N-PROG-RA-0016	TI
Preparation, Maintenance and Application of Probabilistic Safety Assessment	N-STD-RA-0034	TI
Software	N-PROG-MP-0006	TI

Document Title	Document #	Notification Status
Retube Waste Processing Building Safety Analysis Summary Report	NK38-REP-09701-10344	PI
Darlington Retube Waste Processing Building - Safety Assessment	NK38-REP-09701-10326	PI
RWPB Worker Dose During Normal Operations and Under Accident Conditions	NK38-CORR-09701-0597849	PI
Derived Acceptance Criteria for Deterministic Safety Analysis	COG-13-9035-R00	PI

Recommendations and Guidance

Detailed methodologies and derived acceptance criteria for the conduct of deterministic safety analysis are described in the following COG documents:

- COG-09-9030-R03, Principles & Guidelines For Deterministic Safety Analysis;
- COG-11-9023-R00, Guidelines for Application of the Limit of Operating Envelope Methodology to Deterministic Safety Analysis;
- COG-06-9012-R01, Guidelines for Application of the Best Estimate Analysis and Uncertainty (BEAU) Methodology to Licensing Analysis;
- COG-08-2078-R00, Principles and Guidelines for NOP/ROP Trip Setpoint Analysis for CANDU Reactors.

Updates to deterministic safety analysis 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 in elements of a methodology;
  - In plant models;
  - In use of computer codes and embedded models;
  - 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 indicate 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 Section 3. General criteria that CNSC will consider when reviewing such methodologies are provided in Appendix A.4.

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.

CSA N290.17, *Probabilistic safety assessment for nuclear power plants* (2023), provides current industry practice regarding preparation and maintenance of a probabilistic safety assessment (PSA) for a water-cooled nuclear power plant. It is considered one of the CNSC staff acceptable approaches to meet regulatory requirements for the development and maintenance of PSA specified in REGDOC 2.4.2.

5 SCA – PHYSICAL DESIGN

The safety and control area "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.

Performance Objective(s)

There is confirmation that systems, structures and components that are important to nuclear safety and security continue to meet their design basis in all operational states and design basis accidents until the end of their design life.

5.1 Design Program

Licence Condition 5.1:

The licensee shall implement and maintain a design program.

Preamble

The *Class I Nuclear Facilities Regulations* require that a licence application contain a description of the structures, systems and components (SSC), and relevant documentation of the plant design.

A design program ensures that the plant design is 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, 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 ensure that all safety-related SSCs are designed to perform their required functions under all plant states for which the system must remain available. OPG shall ensure that any modifications made to the facility are in accordance with OPG engineering change control process, and CSA standards:

- CSA standard N291, *Requirements for safety related structures for CANDU nuclear power plants* (update no. 2, 2011);
- CSA standard N290.0, *General requirements for safety systems of nuclear power plants*;
- CSA standard N290.12, *Human Factors in Design for Nuclear Power Plants*; and

- CSA standard N290.14, *Qualification of Digital Hardware and Software for Use in Instrumentation and Control Applications for Nuclear Power Plants*

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	Requirements for safety related structures for CANDU nuclear power plants	N291*	2008 and update no. 2, 2011 (Reaffirmed 2013)	2016-01-01
CSA	General requirements for safety systems of nuclear power plants	N290.0	2017 (Reaffirmed 2022)	2024-03-19
CSA	Human Factors in Design for Nuclear Power Plants	N290.12	2014	2018-03-31
CSA	Qualification of Digital Hardware and Software for Use in Instrumentation and Control Applications for Nuclear Power Plants	N290.14	2015 (Reaffirmed 2020)	2022-11-01

** OPG intends to transition to the 2019 edition of CSA N291, Requirements for nuclear safety-related structures, and has committed to be compliant with the standard by January 1, 2027. [e-Doc 7227986, CD# N-CORR-00531-23959]*

OPG has committed to implementing the following CSA standards by 01 January 2027 [e-Doc 7372903, CD# NK38-CORR-00531-25642]:

- CSA N287.1-14 (R2019), *General requirements for concrete containment structures for nuclear power plants*;
- CSA N287.2-17 (R2022), *Material requirements for concrete containment structures for nuclear power plants*; and
- CSA N287.8-15 (R2020), *Aging management for concrete containment structures for nuclear power plants*.

Design Basis Management

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 LC 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 changes to those aspects of design remain within the licensing basis and shall notify the CNSC when such changes are planned. When reviewing such changes, CNSC staff will use the criteria in Appendix A.4 and any other applicable criteria. Changes outside the licensing basis would require prior written approval by the Commission.

The licensee shall ensure that plant design and changes to plant design are accurately reflected in the safety analysis (see section 4.1 for licensee documents that contain the facilities descriptions and the final safety analysis reports). Where specific reports (e.g., external third party reviews as required by CSA standard N293, *Fire protection for nuclear power plants*, which is cited in LC 10.2) are required by the standards in the licensing basis, these shall be submitted to the CNSC.

Design Sub-programs

See LC 5.2 for compliance verification criteria on pressure boundary design and LC 5.3 for compliance verification criteria on equipment and structure qualification.
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 CNSC. When reviewing such changes, CNSC staff will use the criteria in Appendix A.4 and any other applicable criteria. Changes outside the licensing basis would require prior written approval by the Commission. 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.

All changes or modifications, temporary or permanent, to the special safety systems (SSS) and systems related to safety (SRS) shall be identified in the annual reliability report.

The licensee shall have sub-program elements that address the design and modification of concrete containment structures and safety-related structures.

The licensee shall design, build, modify and otherwise carry out work related to the nuclear facility with 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 N293 and, if required, an external third party review shall be performed and the results submitted to the CNSC. See LC 10.2 for version control of CSA N293.

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 excursion, and transient conditions, as confirmed by electrical analysis. The electrical power systems shall be monitored and tested to demonstrate they comply with the design requirements and to verify the operability for AC systems and DC systems.

The licensee shall ensure that the plant overall instrumentation and control (I&C) system and electrical power systems is designed to satisfy the following:

- The safety classification of the I&C system is in compliance with plant level system classification and is justified by analysis;
- System meets 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 single failure criteria.

The licensee shall demonstrate survivability of the I&C systems and component that are critical to the management of BDBAs, and the availability of power supply to necessary equipment and associated I&C for BDBAs.

Prior to making use of a new fuel bundle/fuel bundle string or fuel assembly design in the reactor, the licensee shall perform design verification activities, analyses and testing to demonstrate that design requirements are met. The length and complexities of those activities depend on the novelty of the design. When considering possible design changes to fuel bundles and fuel assemblies, the licensee shall provide prior notification and engage CNSC staff early enough to confirm that the changes are within the licensing basis (see REGDOC-2.4.5). When reviewing such changes, CNSC staff will use the criteria in Appendix A.4 and any other applicable criteria. Changes outside the fuel design basis would require prior written approval by the Commission.

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.4 and any other applicable criteria. Changes outside the reactor core nuclear design basis would require prior written approval by the Commission.

The design of the existing safety-related structures and components and any modification shall include consideration for human factors. For proposed modifications, modern requirements that are consistent with the current licensing basis of the plant shall be applied to the extent practicable.

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.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Conduct of Engineering	N-STD-MP-0028	TI
Engineering Change Control	N-PROG-MP-0001	TI
Configuration Management	N-STD-MP-0027	TI
Design Management	N-PROG-MP-0009	TI

Document Title	Document #	Notification Status
Fuel	N-PROG-MA-0016	TI
Procurement from Licensed Canadian Nuclear Utilities	N-INS-08173-10050	TI
Engineering Change Control Process	N-PROC-MP-0090	PI

As per the agreement reached in CNSC letter dated June 22, 2012 (e-Doc 3947068) a number of design-related codes and standards, associated effective dates and conditions were established. The purpose of the agreement is to ensure consistent and stable design requirements are applied throughout the Darlington Refurbishment Project. For refurbishment design, the agreement took effect upon issuance of the letter; for other design activities the agreement took effect on October 30, 2013. The agreement will remain valid until the end of the Darlington Refurbishment Project, including completion of all close-out documentation.

OPG shall provide to the CNSC the code-over-code reviews conducted for any subsequent editions, addendums and/or updates of the codes and standards that were agreed upon, with OPG's assessment of the changes and their significance upon completion of the review and assessment of significance (e-Doc 3947068 and 4058619). OPG shall submit such assessments on an annual basis.

Recommendations and Guidance

With regard to modifications, the design basis for the plant should be documented and maintained to reflect design changes to ensure adequate configuration management. 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.

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. Recommendations and guidance for considering human factors in design programs are provided in CNSC regulatory document REGDOC-2.5.1, *General Design Considerations: Human Factors*.

Recommendations and guidance are found in the following documents:

- CSA standards N287 Series (287.1 to 287.6), which covers concrete containment structures;
- CSA standards N289 Series (289.1 to 289.5), which covers seismic qualification;
- CSA standards N290 series (290.1 to 290.6), which covers shutdown systems, emergency core cooling, containment systems, reactor control, electrical power and instrument air systems, and monitoring and display functions;
- CSA standard N286.10, *Configuration Management for High Energy Reactor Facilities;*
- REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants*; and
- UFC 3-340-02, which covers structures to resist accidental explosions.

The licensee's 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.

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's implementation of a pressure boundary program and holds the licensee responsible for all aspects of pressure boundary registration and inspections.

A pressure boundary program is comprised of the many programs, processes and procedures and associated controls that are required to ensure compliance with CSA standard N285.0, *General requirements for pressure-retaining systems and components in CANDU nuclear power plants,* which defines the technical requirements for the design, procurement, fabrication, installation, modification, repair, replacement, testing, examination and inspection of pressure-retaining and containment systems, including their components and supports.

This LC also ensures that 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 CSA N285.0 and its applicable referenced publications (e.g. CSA standard B51, *Boiler, pressure vessel and piping*, National Board Inspection Code). The AIA is accredited by the American Society of Mechanical Engineers (ASME) as stipulated by NCA-5121 of the ASME *Boiler and Pressure Vessel Code* (BPVC).

A pressure boundary is 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.

Compliance Verification Criteria

The licensee shall implement and maintain a pressure boundary program. This program shall be in accordance with CSA standard N285.0, *General requirements for pressure retaining systems and components in CANDU nuclear power plants*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	General requirements for pressure-retaining systems and components in CANDU nuclear power plants	N285.0	2008 and update no. 2*	2016-01-01

**Note: (a) Including update no. 1, (b) Annex M and Annex K are accepted to be used as "Normative" Annexes. OPG has committed to transition to CSA N285.0-23 (including Annex G, J and K as "Normative") by 01 January 2027 [CD# N-CORR-00531-23959, e-Doc 7227986].*

OPG has committed to implement the entire CSA N285.6 SERIES-23 by 01 January 2027, after Darlington refurbishment is completed *[CD# N-CORR-00531-23959, e-Doc 7227986]*.

Transitional Provisions to CSA N285.0-08 and update no. 2 with Annex M and Annex K:

Pressure boundary activities shall be compliant with CSA N285.0-08 and update no.2, CSA B51-09 and update no. 1, ASME BPVC 2010 ED with 2011 ADD, ASME B31.1-2010, *Power Piping*, ASME B31.3-2010, *Process Piping Code*, and ASME B31.5-2010, *Refrigeration Piping and Heat Transfer Component Code,* except as provided below:

a) Work packages compliant with CSA N285.0-08 and update no.1, being produced or underway prior to October 30, 2013 will remain valid for implementation until June 30, 2019.
b) Design modifications classified (approved by CNSC or using the OPG Classification procedure) after January 1, 2011 and before October 30, 2013 will be designed and installed to the CSA N285.0 and ASME edition or version specified in the System Classification List, when installed no later than June 30, 2019.
c) Purchase orders compliant with CSA N285.0-08 and update no. 1 issued prior to October 30, 2013 will remain valid for installation.
d) The Code Effective Dates do not apply to "non-design-related" requirements under the codes and standards listed above. CNSC may require OPG's programs or processes to be updated for "non-design-related" requirements to meet the new version of the standards once it is published.
e) OPG shall provide to the CNSC the code-over-code reviews conducted for any subsequent editions, addendums and/or updates of the codes and standards listed above, with OPG's assessment of the changes and their significance upon completion of the review and assessment of significance. OPG shall submit such assessments on an annual basis.

Engineering planning activities for the Darlington Refurbishment Project follow CSA N285.0-08 with update no.2, CSA B51-09 and update no. 1, ASME BPVC 2010 ED with 2011 ADD, ASME B31.1-2010, ASME B31.3-2010, and ASME B31.5-2010.

The licensee shall maintain a Pressure Boundary Program Document roadmap in compliance with Annex N of CSA N285.0-12 and update no. 1.

The licensee shall operate vessels, boilers, systems, piping, fittings, parts, components, and supports safely and keep them in a safe condition. OPG shall:

a) Follow work plans and procedures, accepted by the AIA, to test, maintain, or alter over-pressure protection devices;
b) Comply with operating limits specified in certificates, orders, designs, overpressure protection reports, and applicable codes and standards; and
c) 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.

The licensee shall use the accepted variance to CSA N285.0-08 and Update No. 2, clause 3 and clause 14.2.7, to perform external weld overlay repairs based on the OPG document N-INS-01913.11-10024 "External Weld Buildup to Repair Pressure Retaining Item" (Enclosure 1 of N-CORR-00531-19208, e-Doc 5575333), under the conditions described in CNSC acceptance letter e-Doc 5635890.

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 written notification to CNSC staff, of new or revised overpressure protection reports, after the final registration of the system. General criteria for CNSC's review of such notices are provided in Appendix A.4.

Quality Assurance Program

The licensee's pressure boundary quality assurance program shall comply with clause 10 of CSA N285.0 with the exception of sub-clause 10.2.6. Repair and replacement activities shall comply with subclause 10.3 of CSA N285.0.

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 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:

a) Fittings and components that are cUL or ULC and suitable for the expected environmental conditions and maximum pressure; or
b) 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
c) buried fire protection piping that is in compliance with NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*.

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

The licensee shall always have in place a formal agreement with an AIA to provide services for the pressure boundaries of the nuclear facility as defined by CSA N285.0 and its applicable referenced

publications. The AIA must be accredited by the ASME as stipulated by NCA-5121 of the ASME *Boiler and Pressure Vessel Code*.

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 Standards and Safety Authority (TSSA), who is legally entitled to register designs in Ontario.

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's 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 CSA N285.0, the licensee must first submit the proposed resolution to the AIA for evaluation, and then to the CNSC for consent. Per the agreement with the AIA, the evaluated resolution shall not be implemented without the prior written consent of CNSC staff. General criteria for obtaining prior written consent/approval for a proposed resolution from the CNSC can be found in Appendix A.4.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Pressure Boundary	N-PROG-MP-0004	PI
System and Item Classification	N-PROC-MP-0040	PI
Design Registration	N-PROC-MP-0082	PI
Pressure Boundary Program Manual	N-MAN-01913.11-10000	TI
Index to OPG Pressure Boundary Program Elements	N-LIST-00531-10003	TI
Authorized Inspection Agency for Pressure Boundary Inspection and Registration Service	N-CORR-00531-22359	PI*
OPG - Amendment to the Formal Agreement with the Authorized Inspection Agency for Pressure Boundary Inspection and Registration Services	N-CORR-00531-24236	PI

** Termination of the agreement is considered a change that requires written notification to the CNSC.*

Recommendation and Guidance

Recommendations and guidance are found in the following CSA standards and ASME codes:

- CSA standards N285.6 Series, which covers material standards for CANDU reactor components;
- CSA standards N289 Series, which covers seismic qualification;
- ASME *Boiler and Pressure Vessel Code*;
- ASME B31.1, *Power Piping*;
- ASME B31.3, *Process Piping Code*;
- ASME B31.5, *Refrigeration Piping and Heat Transfer Component Code*; and
- CSA standard B51, *Boiler, pressure vessel and piping*.

Note: Where these standards/codes or portions thereof are required for compliance with a governing standard referenced in the LCH under LC 5.2, compliance to the referenced standards/codes or portions thereof is required for compliance with the governing standard and the LC referencing the overlying standard.

The AIA, and its authorized inspectors, should be familiar with and capable of applying the CSA N285.0 provisions to perform their activities as defined by the standard.

Leak mitigation must be undertaken using a managed process, including engineering review, and additional controls to ensure it is not applied inappropriately. Furthermore, leak mitigation should be managed in accordance with the approved white paper, N-REF-01913.11-00001, 2018, *Temporary Leak Maintenance by Leak Mitigation Process* (Enclosure to N-CORR-00531-19502, e-Doc 5823652).

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 that all required equipment in a nuclear facility are qualified to perform their safety functions if exposed to harsh environmental conditions resulting from credited Design Basis Accidents (DBA) and that this capability is preserved for the life of the plant.

Condition monitoring assesses variables that indicate the physical state of the equipment, and assesses its ability to perform its intended function following the period of observation. Environmental monitoring measures environmental stressors, such as temperature, radiation and operational cycling during normal operating conditions.

Seismic qualification (SQ) ensures that 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 environmental and seismic qualification programs. The programs shall be in accordance with CSA standards:

- CSA standard N290.13, *Environmental qualification of equipment for CANDU nuclear power plants*; and
- CSA standard N289.1, *General requirements for seismic, design and qualification of CANDU nuclear power plants*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	Environmental qualification of equipment for CANDU nuclear power plants	N290.13*	2005 and update no. 1 (2009) (Reaffirmed 2015)	2016-01-01
CSA	General requirements for seismic, design and qualification of CANDU nuclear power plants	N289.1**	2008 (Reaffirmed 2013)	2016-01-01

**N290.13-18 (R2023), Environmental qualification of equipment for nuclear power plants was published in December 2018. OPG has committed to fully implementing this version by 2026-09-30. [e-Doc 6925032, CD# N-CORR-00531-23325]*

***As communicated in N-CORR-00531-23959 (e-Doc 7227986), OPG proposes to transition to the 2018 edition of CSA N289.1 by January 1, 2027.*

OPG has committed to implementing the following standard by 01 January 2027 [CD# NK38-CORR-00531-25642, e-Doc 7372903]:

- CSA N289.3-20, *Design procedures for seismic qualification of nuclear power plants*;
- CSA N289.4-22, *Testing procedures for seismic qualification of nuclear power plant structures, systems, and components*; and
- CSA N289.5-12 (R2022), *Seismic instrumentation requirements for nuclear power plants and nuclear facilities* (Update No. 1, June 2021).

Environmental Qualification

In addition to the criteria set out in CSA N290.13, the EQ program shall include a monitoring program consisting of condition monitoring and environmental monitoring, to measure degradation and failures of qualified equipment, including cables.

Seismic Qualification

Seismically credited safety-related SSCs in a nuclear facility shall be designed, installed and maintained to perform their safety function against earthquakes.

Seismic qualification or modification of a seismically qualified SSC would require prior notification and engagement of CNSC. When reviewing such changes, CNSC staff will use the criteria in Appendix A.4 and any other applicable criteria. Changes outside the licensing basis would require prior written approval by the Commission.

OPG is conducting a gap analysis and will provide CNSC staff with an implementation plan documenting the key dates for OPG to implement CSA N289.2, *Ground motion determination for seismic qualification of CANDU nuclear power plants* (2021) by 3 September 2025 [CD# NK38-CORR-00531-25642; e-Doc 7372903].

The following documents require written notification of change:

Document Title	Document #	Notification Status
Environmental Qualification	N-PROG-RA-0006	TI

Per the agreement reached in CNSC letter dated 22 June 2012 (e-Doc 3947068) a number of design-related codes and standards, associated effective dates and conditions were established, including application of CSA N290.13. The purpose of the agreement is to ensure consistent and stable design requirements are applied throughout the Darlington Refurbishment Project. For refurbishment design, the agreement took effect upon issuance of the letter; for other design activities the agreement took effect on 30 October2013. The agreement will remain valid until the end of the Darlington Refurbishment Project, including completion of all close-out documentation.

OPG shall provide to the CNSC the code-over-code reviews conducted for any subsequent editions, addendums and/or updates of CSA N290.13-05 and update no.1, with OPG's assessment of the changes and their significance upon completion of the review and assessment of significance (e-Doc 3947068). OPG shall submit such assessments on an annual basis.

Recommendations and Guidance

The processes and procedures related to the EQ program should meet the requirements of recognized industrial standards.

In addition to addressing the detailed requirements of CSA N289.1, the licensee SQ sub-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 for periodic inspection and maintenance of conditions to ensure SQ of existing SSCs for the life of the plant;
- Identify the seismic monitoring system and its design and maintenance requirements; and
- Include procedural controls for establishing SQ for new and replacement items.

The processes and procedures related to the SQ program should address the following CSA standards:

- CSA standard N289.2, *Ground motion determination for seismic qualification of nuclear power plants*;
- CSA standard N289.3, *Design procedures for seismic qualification of nuclear power plants*;
- CSA standard N289.4, *Testing procedures for seismic qualification of nuclear power plant structures, systems and components*; and
- CSA standard N289.5, *Seismic instrumentation requirements for nuclear power plants and nuclear facilities*.

6 SCA – FITNESS FOR SERVICE

The safety and control area "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.

Performance Objective(s)

Systems, structures and components whose performance may affect safe operations or security remain available, reliable and effective, and are consistent with the design, quality control measures and analysis documents.

6.1 Fitness for Service Programs

Licence Condition 6.1:

The licensee shall implement and maintain a fitness for service program.

Preamble

The *Class I Nuclear Facilities Regulations* requires that a licence application contain the proposed measures, policies, methods and procedures to maintain the nuclear facility.

The following program elements ensure fitness for service of SSCs:

- Maintenance program defining the policies, processes and procedures that provide direction for maintaining SSCs of the plant;
- Effective control of plant chemistry to ensure critical plant equipment performs safely and reliably;
- Aging management activities to ensure the reliability and available of required safety functions of SSCs;
- Periodic and in-service inspection programs to ensure that pressure-boundary components; containment structures and components, continue to meet their design requirements;
- In-service inspection of balance of plant to ensure safety significant pressure retaining systems, components and safety-related structures are monitored for degradation; and
- Proper reliability program and implementation to ensure that Systems Important to Safety continue to meet their performance requirements.

Compliance Verification Criteria

The licensee shall implement and maintain programs to ensure fitness for service of systems, structures and components. These programs shall be in accordance with:

- CNSC regulatory document REGDOC-2.6.2, *Maintenance Programs for Nuclear Power Plants*;
- CNSC regulatory document REGDOC-2.6.1, *Reliability Programs for Nuclear Power Plants*;
- CNSC regulatory document REGDOC-2.6.3, *Aging Management*;
- CSA standard N285.4, *Periodic inspection of CANDU nuclear power plant components*;
- CSA standard N285.5, *Periodic inspection of CANDU nuclear power plant containment components*;
- CSA standard N285.8, *Technical requirements for in-service inspection evaluation of zirconium alloy in pressure tubes in CANDU reactors*;
- CSA standard N287.7, *In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plants*; and
- CSA standard N291, *Requirements for safety related structures for CANDU nuclear power plants* (update no. 2, 2011).

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Maintenance Programs for Nuclear Power Plants	REGDOC-2.6.2	2017	2020-09-15
CNSC	Reliability Programs for Nuclear Power Plants	REGDOC-2.6.1	2017	2020-09-15
CNSC	Aging Management	REGDOC-2.6.3	2014	2017-07-15
CSA	Periodic inspection of CANDU nuclear power plant components	N285.4*	2014 (2019†)	2019-07-01
CSA	Periodic inspection of CANDU nuclear power plant containment components	N285.5**	2018	2022-05-02
CSA	Technical requirements for in-service inspection evaluation of zirconium alloy in pressure tubes in CANDU reactors	N285.8	2023††	2024-04-05
CSA	In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plants	N287.7***	2008 (Reaffirmed 2013)	2016-01-01
CSA	Requirements for safety related structures for CANDU nuclear power plants	N291****	2008 and update no. 2, 2011	2016-01-01

** OPG has committed to transitioning to the 2023 edition of CSA N285.4, and intends to be fully compliant by 14 November 2029 [e-Doc 7417204, CD# N-CORR-00531-24211].*
*** OPG has committed to transitioning to the 2022 edition of CSA Standard N285.5, by 02 June 2027 [e-Doc 7253021, CD# N-CORR-00531-23903].*
****OPG intends to transition Darlington NGS to the 2017 edition (R2022) of CSA N287.7, In-service examination and testing requirements for concrete containment structures for nuclear power plants, by 30 May 2025 [e-Doc 7245645, CD# NK38-CORR-00531-25234].*

***** OPG intends to transition to the 2019 edition of CSA N291, Requirements for nuclear safety-related structures, and has committed to be compliant with the standard by 1 January 2027 [e-Doc 7227986, CD# N-CORR-00531-23959].*
† Compliance with the 2019 edition is only for the clauses specified under "CVC related to CSA N285.4" in this LCH.
†† Compliance with the 2023 edition is required unless an alternative approach to meet certain Clauses of CSA N285.8-23 is explicitly stated in the accepted compliance plan (N-REP-31100-10061 R006; e-Doc 7251842).

Maintenance

An NPP maintenance program consists of policies, processes and procedures that provide direction for maintaining structures, systems or 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.

CNSC regulatory document REGDOC-2.6.2, *Maintenance Programs for Nuclear Power Plants* outlines the requirements for a maintenance program. In 2017, this document replaced RD/GD-210, *Maintenance Programs for Nuclear Power Plants* in the regulatory framework. Given that REGDOC-2.6.2 has no material changes from RD/GD-210, for compliance purposes where RD/GD-210 is referenced in OPG governing documents, it shall be taken to mean REGDOC-2.6.2. OPG will update the references to RD/GD-210 in their governance in accordance with their regular document review cycle.

Implementation of REGDOC-2.6.2 is verified by CNSC staff through the maintenance-related findings from routine inspections, cross-cutting system inspections and monitoring of maintenance related performance indicators.

Maintenance activities include planning and scheduling, SSC monitoring and work execution. Maintenance performance indicators are monitored and compared to best industry practice where practicable.

Management of Planned Outages:

The maintenance program shall include provisions for the management of planned outages. The licensee's program related to management of planned outages is documented in N-PROC-MA-0013, *Planned Outage Management*.

The licensee shall make outage-related information (including Level 1 and Level 2 Outage Plans, detailing all major work on safety related structures, systems and components to be carried out during the planned outage) available to CNSC staff.

Planned outages represent a key activity that has a high regulatory significance. Therefore a review is required to ensure proper scoping (of safety-related commitments), planning and execution of the commitments (e.g., for heat sinks, dose control, etc.).

Reliability of Systems Important to Safety

CNSC regulatory document REGDOC-2.6.1, *Reliability Programs for Nuclear Power Plants* outlines the requirements for a maintenance program. In 2017, this document replaced RD/GD-98, *Reliability Programs for Nuclear Power Plants* 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 OPG governing documents, it shall be taken to mean REGDOC-2.6.1. OPG will update the references to RD/GD-98 in their governance in accordance with their regular document review cycle.

The licensee shall establish a reliability program 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.

The reliability program assures that the risk-related system functions credited in the PSA and systems important to safety at the plant, can, and will, meet the availability and reliability requirements as stated or assumed in the PSA throughout the lifetime of the facility.

Chemistry Control

The chemistry control sub-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 maintain a set of technical basis documents describing the design basis for chemistry control.

Aging Management

OPG is compliant with the 2014 version of REGDOC-2.6.3, *Aging Management*.

SSC-specific aging management plans (AM plans - also in some cases referred to as life cycle management plans (LCMPs)), shall be implemented in accordance with the overall integrated aging management program framework, and address the attributes of an effective aging management program as listed in REGDOC-2.6.3. The SSC-specific AM plans or LCMPs shall include structured, forward looking inspection and maintenance schedules, requirements to monitor and trend aging effects and any preventative actions necessary to minimize and control aging degradation of the SSCs.

The SSC-specific AM plans or LCMPs which are submitted with, or in support of, the application are licensing basis documents. As such any changes to the SSC-specific AM plans or LCMPs will be reviewed by CNSC staff to confirm that they remain within the licensing basis and provide adequate justification for changes to prior licensee commitments with respect to the inspection scope and other relevant commitments related to the continued operation of the facility. When considering possible changes to activities identified in the AM plans or LCMPs, the licensee shall engage CNSC staff early and provide confirmation that 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 WN table for this section.

<u>Fuel Channel Aging Management</u>

The current operating limit for the Darlington NGS pressure tubes is to a maximum of 235,000 Effective Full Power Hours (EFPH), which was approved by the Commission on December 23, 2015. For further

details see the Summary Record of Decision (e-Doc 4908897). Operation of any unit beyond 235,000 EFPH is not permitted unless approved by the Commission in accordance with LC G.1.

Continued use of Fracture Toughness Model(s)

CNSC staff accepted the use of the Revision 2 Engineering Fracture Toughness model for Probabilistic Core Assessments (PCAs) for flaws, Leak-Before-Break and Fracture Protection evaluations, provided OPG meets the following conditions (e-doc 6795279):

1. The model is only applied to pressure tube material containing a maximum hydrogen equivalent concentration (Heq) up to 100 ppm within 1.5 m from the front end of the tube and up to 140 ppm in the remainder of the pressure tube.
2. The lower bound predictions from the Revision 2 model are adopted for deterministic fracture protection and deterministic leak-before-break evaluations.
3. For PCAs for flaws, Probabilistic Fracture Protection (PFP) and Probabilistic Leak-Before-Break (PLBB) evaluations, the fracture toughness probability distributions used as inputs in the evaluations are obtained from the Revision 2 model with the distributions truncated so the maximum value of fracture toughness for a defined set of input parameters does not exceed the best estimate prediction.

OPG shall submit an impact assessment for CSA N285.8-23 Clause 7 evaluations whenever a fracture toughness test result challenges the model's lower prediction bound, and where the model is applied in the Clause 7 evaluation(s).

Periodic and In-Service Inspection Programs

OPG shall carry out the periodic inspections programs (PIPs) in accordance with the accepted PIP documents. If a deviation from the accepted PIP program is anticipated during inspection planning activities OPG shall obtain CNSC acceptance of the deviation prior to conducting the affected inspections. However, for any findings, discoveries or deviations from the accepted PIP that are identified when conducting an inspection, OPG shall follow OPG governance to provide justification to CNSC in the inspection report submission, based on OPEX and best industry practices. For permanently required exemptions to the requirements of CSA PIP standards, OPG shall document these exemptions in a revised PIP document and submit to the CNSC for acceptance.

When PIP requirements are addressed exclusively within an AMP or LCMP document, only those elements of the document that directly address the PIP requirements of the governing CSA standard require acceptance from CNSC staff prior to implementation.

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 CSA N285.5, as applicable, shall apply, to ensure that personnel are appropriately trained and qualified.

Selection Criteria for Pressure Tube Inspection

In reference to inspected pressure tubes, and to resolve probabilistic core assessment flaw removal assumptions, OPG is to continue to provide evidence that a sample of the pressure tubes with the highest cumulative probability of developing through-wall cracking determined from probabilistic core assessments is included in their pressure tube volumetric inspection program (CNSC letter 6415008; N-CORR-00531-22440). To validate probabilistic core assessment predictions, OPG is to include consideration for higher risk tubes from the probabilistic core assessments in the selection criteria for fuel channel inspection campaigns.

CVC Related to CSA N285.4:

OPG shall comply with the 2014 edition of this standard, May 2014, with the exception of Clauses (including the sub-Clauses) 6.1.4.2, 7.6.1, 8.2.2, 8.2.5(b), 8.3.1, 8.3.2, 8.3.3, 9.4 and Table 5 for which OPG shall comply with the 2019 edition of this standard (see CNSC letter e-Doc 6067846) and any applicable exemptions accepted by the CNSC. The Darlington NGS CSA N285.4 PIP is divided into four system/component groups addressing specific clauses of CSA N285.4 including the General Pressure Boundary Components, Fuel Channel Pressure Tubes, Fuel Channel Feeder Pipes, and Steam Generators Tubes. CNSC staff have accepted the Darlington NGS PIP documents listed in the WN table for this section. Notable elements of the acceptance process for the PIP documents are discussed below.

Fuel Channel (FC) Pressure Tubes (PT) (N285.4 Clause 12)

CNSC staff have accepted OPG's PIP documents for Darlington Fuel Channels (e-Doc 5853238; NK38-CORR-00531-20684).

Evaluation of results and dispositions for Darlington NGS pressure tubes

With respect to CSA N285.4-14 clause 12.2.5.1.3, CNSC staff have reviewed and accepted OPG's compliance plan N-REP-31100-10061 R006 (N-CORR-00531-23853, e-Doc 7176834) for the use of CSA N285.8-23, *Technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors*, as the evaluation method used for the fitness-for-service assessment of Darlington fuel channels[1].

Probabilistic Leak-Before-Break (PLBB) Assessments (CSA N285.8)

With respect to Clause 7.4.3.2 of CSA N285.8-23, the maximum allowable conditional probability over the evaluation period of pressure tube failure caused by a growing axial crack exceeding the critical crack length during the sequence of events from pressure tube through-wall penetration to reactor shutdown shall be less than or equal to 0.10 ruptures per through-wall crack. This applies to the assessed most limiting pressure tube in the reactor core. The acceptance criterion will be revisited by CNSC staff periodically, and adjustments will be made as necessary.

Probabilistic Fracture Protection Assessments (CSA N285.8)

[1] CNSC staff acceptance of the revised plan is documented in CNSC staff letter e-Doc 7251842 (N-CORR-00531-23996).

Probabilistic Fracture Protection (PFP) evaluations completed for pressure tubes in accordance with CSA Standard N285.8 Clause 4.3.2.2 shall use the acceptance criteria and evaluation process documented in the August 21, 2023, correspondence from OPG (e-Doc 7110527, CD# N-CORR-00531-23737).

Fuel Channel Feeder Pipes (N285.4 Clause 13)

With respect to CSA N285.4 clause 8.2.1(d) and clause 13.2.5.1.3, CNSC staff have accepted OPG's request to use COG report COG-JP-4107-V06-R03, *Fitness-for-Service Guidelines (FFSG) for Feeders in CANDU Reactors*, (e-Docs 3922168 and 4001054).

Steam Generator Tubes (N285.4 Clause 14)

CNSC staff have accepted OPG's steam generator tubes PIP for Darlington station.

CNSC staff have accepted the revised "*performance based disposition process*" (e-Doc 6344283) for steam generator inspections and dispositions, which allows the restart of the NGS without a formal CNSC approval of the disposition before restart, subject to an agreed upon set of conditions. Under this process, OPG will analyze and assess the inspection results and disposition the findings using the applicable FFSG. Prior to returning the steam generators to service, OPG is required to confirm, in writing, that the current CNSC accepted disposition for the unit has not been invalidated by the latest inspection findings.

With respect to CSA N285.4 clause 14.2.5.1.3, CNSC staff has accepted OPG's request to use COG report COG-07-4089–R02, *Fitness-for-Service Guidelines for Steam Generator and Preheater Tubes*, with the following conditions (e-Doc 5503070):

- Paragraph IB-2 (d), Requirements for Application of FFSG: Before the CNSC can grant regulatory acceptance of a steam generator disposition using steam generator tube loading based on actual operating transient data rather than on design basis transients, the licensee must justify that the loads used are conservatively bounding for future operation. OPG is expected to provide the necessary supporting information with a request for acceptance of a disposition.
- Table ID-2, Maximum Allowable Probabilities of Not Satisfying Leak-before-Break for a Reactor Unit: If the licensee intends to use probabilistic assessment methods for Leak-Before-Break as described in Section ID-2.3.2.2 then it must be demonstrated that the probabilistic acceptance criteria in Table ID-2 (10-2) appropriately demonstrates that steam generator tube structural integrity margins are maintained when compared to deterministic Leak-Before-Break acceptance criteria

CVC Related to CSA N287.7

CNSC staff have accepted the Darlington NGS CSA N287.7 PIP documents listed in the "Document Version Control" table of this section including the leakage rate test documents for the concrete containment structures and the technical specification for the post-tensioning system inspection (e-Doc 4788314).

OPG shall carry out the inspections and tests of the vacuum building, the dousing system and the pressure relief duct at least once every twelve years, as agreed upon in CNSC correspondence "Vacuum Building Test and Inspection Frequency" (e-Doc 967920).

OPG conducted a Vacuum Structure Positive Pressure Test in 2015 based on CNSC staff acceptance of OPG's request to defer it from the 2009 Vacuum Building Outage (VBO). OPG also performed a test to measure the leakage rate, at full positive design pressure, of the Main Containment Structure in 2015. These tests shall be repeated every twelve years (e-Doc 4429280).

In addition, OPG shall inspect the concrete structures of the Main Containment Structures and their components once every six years in accordance with the CSA N287.7 PIP.

In-service Inspection of Balance of Plant

The licensee shall have adequate knowledge of the current state of BOP pressure retaining systems, components and safety-related structures to ensure that they are capable of operating within their design intent and perform required safety functions if called upon.

The licensee shall develop, implement and maintain in-service inspection program(s) and LCMPs for these systems in keeping with industry best practices including:

a) An ISI sub-program for safety-significant BOP pressure retaining systems and components; and

b) An ISI sub-program for BOP safety-related structures, excluding concrete containment structures in accordance with CSA standard N291-08, *Requirements for safety-related structures for CANDU nuclear power plants*.

N-PROG-MA-0017, *Components and Equipment Surveillance*, includes a comprehensive set of activities to evaluate, inspect, test and report on the health of specific safety-significant BOP component groups which forms part of the pressure-retaining system and components.

N-PROG-MP-0008, *Integrated Aging Management*, defines and provides the requirements for the establishment of the aging management scope related to safety-related BOP civil structures.

OPG has committed to implementing the 2021 edition of CSA Standard N285.7, *Periodic inspection of CANDU nuclear power plant balance of plant systems and components*. OPG intends to be fully compliant by 12 September 2029 [CD# N-CORR-00531-24090, e-Doc 7373576].

The following documents require written notification of change:

Document Title	Document #	Notification Status
Maintenance		
Conduct of Maintenance	N-PROG-MA-0004	TI
Component and Equipment Surveillance	N-PROG-MA-0017	TI
Production Work Management	N-PROG-MA-0019	TI
Integrated Aging Management	N-PROG-MP-0008	TI
Planned Outage Management	N-PROC-MA-0013	TI

Document Title	Document #	Notification Status
Forced Outage Management	N-PROC-MA-0049	TI
Reliability		
Equipment Reliability	N-PROG-MA-0026	TI
Risk and Reliability Program	N-PROG-RA-0016	TI
Reliability Monitoring and Reporting of Systems Important to Safety	N-STD-RA-0033	TI
List of Safety Related Systems and Functions	NK38-LIST-06937-10001	PI
Aging Management		
Major Components	N-PROG-MA-0025	TI
Feeders Life Cycle Management Plan	N-PLAN-01060-10001	PI*
Feeders Life Cycle Management Plan: Technical Basis Document	N-PLAN-01060-10007	TI
Fuel Channel Life Cycle Management	N-PROC-MA-0044	TI
Feeders		
Darlington Nuclear Unit 1 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	NK38-PIP-33160-10001	PI
Darlington Nuclear Unit 2 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	NK38-PIP-33160-10002	PI
Darlington Nuclear Unit 3 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	NK38-PIP-33160-10003	PI
Darlington Nuclear Unit 4 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	NK38-PIP-33160-10004	PI
Fitness-for-Service Guidelines (FFSG) for Feeders in CANDU Reactors	COG-JP-4107-V06-R03	PI
Pressure Boundary		
Steam Generators Life Cycle Management Plan	N-PLAN-33110-10009	PI*
Steam Generators		
Darlington Units 1-4 Steam Generator Life Cycle Management Plan	NK38-PLAN-33110-00001	PI*
Fitness-for-Service Guidelines for Steam Generator and Preheater Tubes	COG-07-4089–R02	PI**
Fuel Channels		
Fuel Channels Life Cycle Management Plan	N-PLAN-01060-10002	PI*
Darlington Nuclear 1-4, Unit 1 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	NK38-PIP-31100-10001	PI

Document Title	Document #	Notification Status
Darlington Nuclear 1-4, Unit 2 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	NK38-PIP-31100-10002	PI
Darlington Nuclear 1-4, Unit 3 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	NK38-PIP-31100-10003	PI
Darlington Nuclear 1-4, Unit 4 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	NK38-PIP-31100-10004	PI
Reactor Components and Structures Life Cycle Management Plan	N-PLAN-01060-10003	PI
Long Term Darlington Life Management Plan for Inconel X-750 Annulus Spacers	NK38-PLAN-31160-10000	PI
Compliance Plan for Long-Term Use of CSA N285.8 For In-Service Evaluation of Zirconium Alloy Pressure Tubes	N-REP-31100-10061	PI
Acceptance Criteria and Evaluation Procedures for Material Surveillance Pressure Tube	N-REP-31100-10041	PI
Periodic Inspection Plans		
Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 1	NK38-PIP-03641.2-10001	PI
Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 2	NK38-PIP-03641.2-10002	PI
Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 3	NK38-PIP-03641.2-10003	PI
Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 4	NK38-PIP-03641.2-10004	PI
Darlington Nuclear Generating Station – Periodic Inspection Program for Unit 0 and Units 1 To 4 Containment Components	NK38-PIP-03642.2-10001	PI
Darlington Nuclear – Unit 0 Containment Periodic Inspection Program	NK38-PIP-03643.2-10002	PI
Aging Management Plan for Concrete Containment Structures and Safety Related Structures	N-PLAN-01060-10004	PI
Darlington Nuclear – Reactor Building Periodic Inspection Program	NK38-PIP-03643.2-10001	PI
Darlington Nuclear – Vacuum Building Periodic Inspection Program	NK38-PIP-03643.2-10003	PI
Inspection of Post Tensioning Tendons on DNGS Vacuum Building	NK38-TS-03643-10001	PI
Administrative Requirements for In-Service Inspection and Testing for Concrete Containment Structures	N-PROC-MA-0066	PI
Non-Destructive Examination	I-STD-AS-0003	TI
Balance of Plant		
Darlington NGS Main Containment Structure In-Service Leakage Rate Test Requirements in Accordance with CSA N287.7-08	NK38-REP-34200-10066	PI

Document Title	Document #	Notification Status
Darlington NGS Vacuum Structure In-Service Leakage Rate Test Requirements in Accordance with CSA N287.7-08	NK38-REP-26100-10005	PI

**Prior notification is only required when changes to the document result in changes to the PIP that has received regulatory acceptance.*
***With the exceptions listed under the CVC for steam generator tubes.*

Recommendations and Guidance

Maintenance

The range of maintenance activities includes 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

The outage program should have designated criteria that the licensee will follow to confirm that planned and discovery work has been satisfactorily completed during the planned outage, and that all safety-significant SSCs are available to ensure the continued safe operation of the facility.

CNSC staff located at the site offices should be invited to the restart meetings in order to verify that all appropriate reviews for restart of the reactor have occurred.

Management of Planned Outages

Outage completion assurance statement should include the status of planned work that was identified in the notification of regulatory undertakings but not completed.

Reliability of Systems Important to Safety

CSA standard N290.9, *Reliability and maintenance programs for nuclear power plants*, mirrors the requirements in REGDOC-2.6.1 and contains additional guidance.

Inspection Programs for Balance of Plant

The licensee should document the current status of all of the safety-significant pressure-retaining components and develop aging management or LCMPs following the regulatory requirements of CNSC regulatory document REGDOC-2.6.3, *Aging Management*. The licensee may elect to use alternative approaches, provided the elements identified in REGDOC-2.6.3 are addressed in an equivalent manner, and are demonstrated to be effective in managing aging. The plans should apply a systematic and integrated approach to establish, implement and improve programs to manage aging and obsolescence of SSCs. SSC-specific LCMPs and AMPs should be implemented in accordance with the licensee's overall integrated AMP framework.

Non-destructive examination (NDE) procedures used in the Components and Equipment Surveillance sub-program should be developed and implemented using a level of rigour consistent with the safety significance of systems and components and the nature of the degradation. For NDE procedures necessary to carry out inspections in the BOP programs, guidance may be obtained from NDE requirements for the PIP program addressed in CSA standard N285.4, *Periodic inspection of CANDU nuclear power plant components*.

Aging Management

Whenever a revision to the AMP, SSC-specific AMP or LCMP is submitted to CNSC for review, the licensee should identify whether the revision(s), affects the previously planned inspection and maintenance activities, with supporting technical basis for the change.

The licensee should maintain a roadmap outlining the programs and procedures that ensure a well-documented overall integrated aging management framework exists.

7 SCA – RADIATION PROTECTION

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

Performance Objective(s)

The health and safety of persons inside the facility are protected through the implementation of a radiation protection program that ensures that occupational exposures are below regulatory dose limits and are optimized and maintained ALARA.

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. The program must ensure that doses to 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.

Note that the regulatory dose limits are explicitly provided in the *Radiation Protection Regulations*.

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 of 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. ALs are not intended to be static and are to reflect operating conditions in the station.

Administrative Dose Limits (ADLs) are the licensee's internal dose limits designed to ensure individuals do not exceed regulatory dose limits. Certain ADLs that are exceeded without prior approval from the designated licensee authority are considered AL exceedances, as defined in the *Radiation Protection Regulations*.

Compliance Verification Criteria

Radiation Protection Program

Provisions for respiratory protection are captured in OPG-PROC- 0132, *Respiratory Protection*, identified as a document requiring written notification under LC 8.1.

Additionally, the radiation protection program shall ensure that occupational exposures are ascertained and recorded in accordance with the *Radiation Protection Regulations*, through the establishment of dosimetry requirements.

Radiation Protection Action Levels

The ALs and ADLs are considered part of the licensing basis. Changes to these limits are subject to LC G.1. The current ALs and ADLs for this facility are extracted from N-STD-RA-0044, *Occupational Radiation Protection Action Levels for Power Reactor Operating Licences*, and N-PROC-RA-0019, *Dose Limits and Exposure Control*, 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 its own change control process).

Action Levels: Worker Dose

Field of application	Value	Action Level
DOSE TO WORKERS: Individual worker external radiation dose received on a job greater than planned	2mSv (200 mrem)	A person receives an external whole body dose that equals or exceeds 2 mSv (200 mrem) above the Electronic Personal Dosimeter (EPD) dose alarm set point.
DOSE TO WORKERS: Individual worker internal exposures greater than planned	2400 kBq/L (65 µCi/L) [2 mSv or (200 mrem)]	A person receives a single intake of tritium oxide (tritiated water) in which the unplanned component of the initial concentration immediately after intake is estimated to equal or exceed 2400 kBq/L (65 µCi/L) (representing an unplanned exposure of 2 mSv (200 mrem)).
DOSE TO WORKERS: Individual worker internal exposure to radionuclides (other than tritium as tritium oxide) greater than planned	0.1 ALI for a radionuclide other than tritium (tritium oxide). [2 mSv or (200 mrem)]	A person receives an intake of a radionuclide other than tritium (in the form of tritium oxide) attributable to a single event that equals or exceeds an unplanned exposure of 2 mSv [200 mrem]
DOSE TO WORKERS: Cumulative annual Individual radiation dose exceeds annual administrative dose limits without approval.	The Administrative Dose Limits (ADLs) are shown in the Table below.	An individual's total whole body radiation dose accumulated over a calendar year exceeds his annual Administrative Dose Limit (ADL) without approval. Doses that are to be compared with the ADLs include doses received at all places of employment during the year.

Administrative Dose Limits:

Whole Body Dose (Effective) limits (one calendar year)		
Category of Worker	**Ontario Power Generation Employees**	**Contract and Building Trades Union Employees**
Nuclear Energy Workers (NEW)	20 mSv (2 rem)	40 mSv (4 rem)
NEW with a lifetime whole body dose greater than 500 mSv (50 rem)	10 mSv (1 rem)	Not applicable
Non-New	0.5 mSv (0.05 rem)	0.5 mSv (0.050 rem)
Whole Body Dose (Effective) limits (rolling 5 calendar years)		
NEW	50 mSv (5 rem)	90 mSv (9 rem)

Action Levels: Surface Contamination Levels

Field of application	**Action Level**	**Observations**
CONTAMINATION CONTROL: Alpha or Beta-gamma surface contamination levels beyond limits in Zone 1.	37 kBq/m^2 (1 µCi/m^2) (beta-gamma); 0.5 kBq/m^2 (0.01 µCi/m^2) (alpha); 7.4 kBq (200 nCi) Cs-137-equivalent beta/gamma (for a DRP)	Total (fixed and loose) surface contamination levels greater than 37 kBq/m^2 (1 µCi/m^2) (beta-gamma) or 0.5 kBq/m^2 (0.01 µCi/m^2) (alpha) are found in Zone 1 or a Discrete Radioactive Particle (DRP) of 7.4 kBq (200 nCi) Cs-137 equivalent activity found in Zone 1.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Radiation Protection	N-PROG-RA-0013	PI
Controlling Exposure As Low As Reasonably Achievable	N-STD-RA-0018	TI
Occupational Radiation Protection Action Levels for Power Reactor Operating Licences	N-STD-RA-0044	PI
Dose Limits and Exposure Control	N-PROC-RA-0019	PI
Radioactive Work Planning, Execution and Close Out	N-PROC-RA-0027	TI
Radiation Dosimetry Program – General Requirements	N-MAN-03416-10000	TI
Radiation Dosimetry Program – External Dosimetry	N-MAN-03416.1-10000	TI

Document Title	Document #	Notification Status
Radiation Dosimetry Program – Internal Dosimetry	N-MAN-03416.2-10000	TI
Respiratory Protection	OPG-PROC-0132	TI

Recommendations and Guidance

CNSC regulatory document REGDOC-2.7.1, *Radiation Protection*, provides the licensee guidance for developing, implementing and maintaining a radiation protection program to ensure that exposures will be ALARA. REGDOC-2.7.1 also provides the licensees guidance for developing ALs in accordance with the *General Nuclear Safety and Control Regulations* and section 6 of the *Radiation Protection Regulations*.

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. If the review results in a revision to a CVC document, the revised document will be subject to LC G.2.

8 SCA – CONVENTIONAL HEALTH AND SAFETY

The Safety and Control Area "Conventional Health and Safety" covers the implementation of a program to manage workplace safety hazards and to protect personnel and equipment.

Performance Objective(s)

Conventional health and safety work practices and conditions achieve a high degree of personnel 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

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed worker health and safety policies and procedures.

NPPs in Ontario are regulated by the *Ontario Occupational Health and Safety Act* and the *Labour Relations Act*.

Compliance Verification Criteria

The licensee has the primary responsibility for safety at all times. This responsibility cannot be delegated or contracted to another organization or entity. The licensee shall ensure that contractors and other organizations present on site are informed of and uphold their roles and responsibilities related to conventional health and safety.

N-PROG-RA-0012, *Fire Protection*, and NK38-LIST-78000-10001, *Application of CSA N293 to Structures, System and Components for Darlington Nuclear*, may identify specific SSCs in the protected area or exclusion zone to which the requirements of CSA standard N293, *Fire protection for CANDU nuclear power plants*, are not applied, in which case the requirements of the 2010 edition of the *National Building Code of Canada* and the 2010 edition of the *National Fire Code* shall be applied. See LC 10.2 for version control of CSA N293.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Work Protection	N-PROG-MA-0015	TI
Employee Health and Safety Policy	OPG-POL-0001	TI
Environment Health and Safety Managed Systems	OPG-PROG-0005	TI
Respiratory Protection	OPG-PROC- 0132	TI

Document Title	Document #	Notification Status
Fire Protection	N-PROG-RA-0012	PI
Application of CSA N293 to Structures, System and Components for Darlington Nuclear	NK38-LIST-78000-10001	PI

Recommendations and Guidance

It is expected that OPG will apply the Ontario Building and Fire Codes to SSCs within the exclusion zone but external to the protected area. For fire protection, N-PROG-RA-0012, *Fire Protection*, and NK-38-LIST-78000-10001, *Application of CSA N293 to Structures, Systems and Components for Darlington Nuclear,* may identify specific SSCs in the exclusion zone to which the requirements of CSA N293 are applied.

Additional information can be found in CNSC regulatory document REGDOC-2.8.1, *Conventional Health and Safety.*

9 SCA – ENVIRONMENTAL PROTECTION

The safety and control area "Environmental Protection" covers programs that identify, control, and monitor all releases of radioactive and hazardous substances and the effects on the environment from facilities or as the result of licensed activities.

Performance Objective(s)

The environment and the health and safety of persons are protected by the licensee taking all reasonable precautions, including identifying, controlling and monitoring the release of nuclear substances and hazardous substances to the environment.

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 7 days.

Preamble

The *Class I Nuclear Facilities Regulations* set out requirements related to environmental protection that must be met by the applicant.

The *General Nuclear Safety and Control Regulations* require every licensee to take all reasonable precautions to protect the environment and to control the release of radioactive nuclear substances or hazardous substances within the site of the licensed activity and into the environment as a result of the licensed activity.

CNSC regulatory policy P-223, *Protection of the Environment* and CNSC regulatory document REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.1*, 2017, describes the principles and factors that guide the CNSC in regulating the development, production and use of nuclear energy and the production, procession and use of nuclear substances, prescribed equipment and prescribed information in order to prevent unreasonable risk to the environment in a manner that is consistent with Canadian environmental policies, acts and regulations and with Canada's international obligations.

The release of hazardous substances is regulated by the Province of Ontario and Environment and Climate Change Canada (ECCC) through various acts and regulations, as well as the CNSC.

Derived Release Limits

Derived Release Limits (DRLs) are calculated or derived using environmental transfer modeling that describes transfer of radioactive materials through environmental pathways to humans. DRLs are required

for the purpose of protecting members of the public from unreasonable risk resulting from releases of radionuclides into the environment from the normal operation of the licensed facility.

The release of hazardous substances is regulated by the CNSC as well as both the Ontario Ministry of Environment, Conservation and Parks (MECP) and Environment and Climate Change Canada (ECCC) through various acts and regulations.

Action Levels

OPG has set Environmental Action Levels (EAL) and related parameters, 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 DRLs. EALs are designed to alert licensees before DRLs are reached. They are required by regulations to be specific doses of radiation or other parameter that, if reached, may indicate a loss of control of the licensee's Environmental Protection Program.

Compliance Verification Criteria

The licensee shall implement and maintain programs to ensure environmental protection as set out in the licensing basis (LCH Section G.1). These programs shall comply with the requirements set out in:

- CNSC regulatory document REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*;
- CSA standard N288.1, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*;
- CSA standard N288.4, *Environmental monitoring programs at nuclear facilities and uranium mines and mills*;
- CSA standard N288.5, *Effluent and emissions monitoring programs at nuclear facilities*; and
- CSA standard N288.6, *Environmental risk assessments at class I nuclear facilities and uranium mines and mills*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
Effluent and Emissions Control (Releases)				
CSA	Effluent and emissions monitoring programs at nuclear facilities	N288.5	2022	2023-02-15
CSA	Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities	N288.1*	2014 (Reaffirmed 2019)	2019-01-01
CSA	Performance Testing of Nuclear Air-Cleaning Systems at Nuclear Facilities	N288.3.4	2013 (Reaffirmed 2022)	2017-12-14
CSA	Establishing and implementing action levels for releases to the environment from nuclear facilities	N288.8	2017 (Reaffirmed 2022)	2023-12-31

Environmental Management System (EMS)				
CNSC	Environmental Protection Policies, Programs and Procedures	REGDOC-2.9.1**	2013	2016-01-01
CSA	Environmental management of nuclear facilities: Common requirements of the CSA N288 series of Standards	N288.0	2022	2023-02-15
Assessment and Monitoring				
CSA	Environmental monitoring programs at nuclear facilities and uranium mines and mills	N288.4	2019	2024-03-19
CSA	Groundwater protection programs at Class I nuclear facilities and uranium mines and mills	N288.7†	2015 (Reaffirmed 2020)	2022-12-31
Environmental Risk Assessment (ERA)				
CSA	Environmental risk assessments at Class I nuclear facilities and uranium mines and mills	N288.6††	2012 (Reaffirmed 2017)	2016-12-01

**OPG intends to transition Darlington NGS to the 2020 edition of the standard. The DRLs will be revised by December 31, 2027, and Darlington NGS will be compliant with CSA N288.1-20 when the station has implemented the new DRLs. OPG will submit the revised Darlington NGS DRLs and planned implementation date to CNSC staff by 14 January 2028 [e-Doc 7245645, CD# NK38-CORR-00531-25234].*

***REGDOC-2.9.1 Version 1.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures was published in April 2017. As described in OPG letter N-CORR-00531-22251 (e-Doc 6355265), OPG has developed a plan to implement REGDOC-2.9.1 Version 1.1 by December 31, 2022. CNSC staff consider the implementation date of the REGDOC to be effective as of December 31, 2022.*

†OPG has committed to transitioning Darlington NGS to the 2023 edition of CSA N288.7 and intends to be compliant by 30 June 2025 [e-Doc 7406530, CD# N-CORR-00531-24282].

††OPG has committed to be compliant with the 2022 edition of CSA N288.6 once the next Environmental Risk Assessment (ERA) is completed. The next Darlington site ERA is due by 30 November 2026 [e-Doc 7245645, CD# NK38-CORR-00531-25234].

OPG-POL-0021, *Environmental Policy*, and OPG-PROG-0005, *Environment Health and Safety Managed Systems*, are key documents of the "Environmental Protection" program. CSA N286-12 defines additional requirements needed to adequately address environmental protection. Refer to LCH Section 1.1 for version details regarding the implementation of N286.

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 incorporate 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.

OPG Darlington's Effluent Monitoring Program shall be compliant with CSA N288.5-22 Effluent and emissions monitoring programs at nuclear facilities.

Measures to Control Releases of Nuclear and Hazardous Substances

Nuclear Substances – Derived Release Limits

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 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 LC G.1. The DRLs for this facility 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 its own change control process).

Release Category	Radionuclide	DRL(Becquerel/year)
Air	Tritium (HTO)	3.91E+16
	Elemental Tritium (HT)	6.26E+17
	Iodine (mixed fission products)	1.74E+12
	Carbon-14	7.68E+14
	Noble Gases	3.46E+16
	Particulate – Gross Beta-Gamma	5.51E+11
	Particulate – Gross Alpha	9.82E+10
Water	Tritium	6.36.E+18
	Carbon-14	6.97E+14
	Gross Alpha	4.39E+11
	Gross Beta-Gamma	3.47E+13

These DRLs for radionuclides and radionuclide groups account for the most significant releases and are the focus of monitoring and reporting requirements.

Note: During refurbishment of Darlington NPP, OPG is reporting % of DRL as % of Flow Adjusted Release Limits (FARLS) for liquid releases in the Safety Performance Indicator reports.

Nuclear Substances – Environmental Action Levels (EAL)

The EALs are considered part of the licensing basis. Changes to these limits are subject to LC G.1. In accordance with the requirements of LC 3.3 and REGDOC-3.1.1, OPG shall notify the Commission within seven days of becoming aware that an action level has been reached. The current EALs (effective as of 30 December 2023) for this facility 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 its own change control process).

Release Category	Radionuclide	Action Levels: Gaseous releases (Becquerel/week)
Air	Tritium (HTO)	1.78E+13
	Elemental Tritium (HT)	3.81E+13
	Iodine (mixed fission products)	6.11E+6
	Carbon-14	1.08E+11
	Noble Gases*	3.30E+12
	Particulate	4.51E+06
Release Category	Radionuclide	Action Levels: Liquid releases (Becquerel/month)
Water	Tritium (HTO)	1.17E+14
	Carbon-14	NA
	Gross Beta-Gamma	7.99E+09

** Units for noble gas action level are Bq-MeV/week*

Hazardous Substances

The licensee shall control hazardous substances releases according to the limits defined in the licensing basis in accordance with the applicable environmental compliance approvals, provincial and other federal legislation and take action to investigate and correct the cause(s) of increased releases.

Environmental Management System (EMS)

The objective of the environmental protection policies, programs and procedures is to establish adequate provisions for protection of the environment. This shall be accomplished through an integrated set of documented activities of an environmental management system (EMS).

OPG shall implement and maintain 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. OPG environmental management program shall be compliant with REGDOC-2.9.1, *Environmental Protection Policies, Programs and Procedures*, version 2013.

OPG shall ensure that all aspects of its environmental management program are effectively implemented in order to assure compliance with environmental regulatory requirements and expectations, including those set in the International Organization for Standardization 14001, *Environmental Management Systems*. OPG's EMS is registered to the ISO-14001. Having the ISO-14001 certification is not part of the

CNSC requirement; however, it shows that a third party recognized OPG's Environmental Management System as being in accordance with the standard.

Assessment and Monitoring

An environmental monitoring program 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 design of the EMP.

OPG Darlington's Environmental Monitoring Program shall be compliant with CSA N288.4-19 Environmental monitoring programs at nuclear facilities and uranium mines and mills.

Protection of people

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 Darlington site annually, in accordance with REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants* [LC 3.3], in the Environmental Protection report.

Environmental Risk Assessment

In accordance with CSA N288.4 and N288.5, the ERA establishes the basis for both the environmental monitoring program and the effluent monitoring program. 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.

OPG Darlington's ERA shall be compliant with CSA N288.6- 2012 Environmental risk assessments at Class I nuclear facilities and uranium mines and mills.

The following documents require written notification of change:

Document Title	Document Number	Prior Notification
Effluent and Emissions Control (Releases)		
Monitoring of Nuclear and Hazardous Substances in Effluents	N-STD-OP-0031	TI
Environment Manual	NK38-MAN-03480-10001	TI

Document Title	Document Number	Prior Notification
Derived Release Limits for Darlington Nuclear Generating Station	NK38-REP-03482-10001	PI
Environmental Approvals	N-PROC-OP-0037	TI
Environmental Management System (EMS)		
Environmental Policy	OPG-POL-0021	TI
Environment Health and Safety Managed Systems	OPG-PROG-0005	TI
Contaminated Lands Management	N-PROC-OP-0044	TI
Hazardous Material Management	OPG-PROC-0126	TI
Abnormal Waterborne Tritium Emission Response	N-PROC-OP-0038	TI
Assessment and Monitoring		
Management of the Environmental Monitoring Programs	N-PROC-OP-0025	TI
Darlington Environmental Monitoring Program	NK38-MAN-03443-10002	TI
Groundwater Protection and Monitoring Program	N-STD-OP-0046	PI
Environmental Risk Assessment (ERA)		
2020 Environmental Risk Assessment for the Darlington Nuclear Site	D-REP-07701-00001	TI
2024 Environmental Risk Assessment Addendum for the Darlington Nuclear Site	D-REP-07701-00002	TI

Recommendations and Guidance

Guiding principles and factors for CNSC staff consideration are also given in CNSC Regulatory policy P-223, *Protection of the Environment* and CNSC regulatory document REGDOC-2.9.1, *Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.1*, 2017.

It is recommended that the licensee provide to the CNSC a copy of the reports sent to the Ministry of the Environment and Environment Canada on hazardous releases.

The licensee should review and, if necessary, revise and reissue the DRLs & EALs specified above at least once every five years, in accordance with CSA N288.2, *Guidelines for Calculating the Radiological Consequences to the Public of a Release of Airborne Radioactive Material for Nuclear Reactor Accidents*, 2019.

CNSC staff use the criteria set out in CSA N288.1, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, as guidance to help assess the adequacy of DRLs established by the licensee.

CNSC staff use the criteria set out in CSA N288.8, *Establishing and implementing action levels for releases to the environment from nuclear facilities,* as guidance to help assess the adequacy of EALs established by the licensee.

10 SCA – EMERGENCY MANAGEMENT AND FIRE PROTECTION

The safety and control area "Emergency Management and Fire Protection" covers emergency plans and emergency preparedness programs that exist for emergencies and for non-routine conditions. This area also includes any results of participation in exercises.

Performance Objective(s)

The licensee is ready to respond effectively to any fire or emergency situation.

10.1 Emergency Preparedness Program

Licence Condition 10.1:

The licensee shall implement and maintain an emergency preparedness program.

Preamble

The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the licensee's proposed mitigating measures for on-site and off-site events. This includes measures to prevent or mitigate the effects of accidental releases of nuclear and hazardous substances to the environment, to protect the health and safety of persons, to ensure the maintenance of national security, as well as measures to assist off-site planning authorities regarding an accidental release for:

- Planning and preparing to limit the effects;
- Notification;
- Reporting of information during and after;
- Assisting off-site authorities with dealing with effects; and
- Testing the implementation of the measures to prevent or mitigate the effects.

As part of the emergency preparedness program, the licensee shall have a public information program consistent with CNSC regulatory document REGDOC-3.2.1, *Public Information and Disclosure*. This is addressed in licence condition G.6.

The licensee also has processes in place to ensure business continuity in the event of an emergency (see LC 2.1).

In addition to the nuclear emergency plan, the licensee maintains a set of emergency operating procedures and abnormal plant operating procedures. This aspect is covered under licence condition 3.1.

A security response to malevolent acts is governed by a separate plan under OPG's nuclear security program (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 and radioactive materials transportation emergency response plan are also governed by separate plans (LCs 9.1 and 14.1, respectively).

Compliance Verification Criteria

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*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Nuclear Emergency Preparedness and Response, Version 2	REGDOC-2.10.1	2016	2021-09-24

The emergency program consists of a description to cope with accidental releases. This program encompasses both emergency preparedness 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;
- 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; and
- Public education program.

The licensee's Consolidated Nuclear Emergency Plan (CNEP) 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 Provincial Nuclear Emergency Response Plan (PNERP). The licensee shall maintain equipment, procedures and staff to support off- site response activities for an accidental release. Infrastructures defined within the PNERP may be used in planning and response to virtually all emergencies. The licensee's Nuclear Emergency Plan also represents a basis for controlling changes and modifications to the licensee's nuclear emergency preparedness program.

OPG is required to conduct Emergency Exercises and Drills as described in the CNEP. Drills and/or exercises are required at least annually in most areas. The drill and exercise program details the requirements for corporate exercises, testing of drill and exercise objectives, and coordination with non-OPG facilities. Participation by municipal and provincial emergency response groups is scheduled by mutual agreement.

The licensee implements and maintains a "Business Continuity Program", to support minimum shift complement staffing and makes provisions should a labour dispute arise by implementing and maintaining strike contingency documentation, "Contingency Guideline for Maintaining Staff in Key Positions When Normal Station Access is Impeded" (refer to LC 1.1).

The licensee shall provide the necessary resources and support to provincial and municipal authorities in implementing the provincial and municipal plans to do the following, or the licensee shall do the following:

- Ensure that a sufficient quantity of iodine thyroid blocking (ITB) agents are pre-distributed, to all residences, businesses and institutions within the primary zone, together with instructions on their proper administration;
- Ensure that a sufficient quantity of ITB agent is pre-stocked and available within the secondary zone to the extent practicable. This pre-stocked inventory of ITB agents shall be located so that it can be promptly and efficiently obtained by, or provided to, members of the public with particular consideration to sensitive populations such as children and pregnant women;
- Ensure that pre-distributed and pre-stocked ITB agents are maintained within their expiry date;
- Ensure that pre-distribution plans are supported by a robust, ongoing, and cyclical public education program; and
- Ensure that public emergency preparedness information is provided to all residences, businesses and institutions within the primary zone and readily available to the general public, including online.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Consolidated Nuclear Emergency Plan	N-PROG-RA-0001	PI
OPG Nuclear Emergency Response Organization Drills and Exercises	N-PROC-RA-0045	TI

Recommendations and Guidance

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.

Regarding the distribution of ITB agents, recognizable locations with credible persons within the community, such as fire stations, police stations and pharmacies should be considered in the selection of pre-stocking locations.

10.2 Fire Protection Program

Licence Condition 10.2:

The licensee shall implement and maintain a fire protection program.

Preamble

Licensees require a comprehensive Fire Protection Program (FPP) to ensure the licensed activities do not result in 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 maintenance 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 by LC 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*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	Fire protection for nuclear power plants	N293*	2012 and Update No.1 (R2022)	2023-06-30

**OPG is conducting a gap analysis for the 2023 edition of CSA N293 and has committed to providing CNSC staff with an implementation plan by 03 September 2025 [CD# NK38-CORR-00531-25642, e-Doc 7372903].*

Fire Protection

The licensee shall assess the Fire Hazard Assessment and Fire Safe Shutdown Analysis revisions against the requirements of CSA N293 and provide a justification of any non-conformances found and development 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 an FPP audit every three years. The resulting inspection and audit reports shall be submitted to CNSC staff.

As per the Integrated Safety Review (ISR) process and as permitted by CSA N293, CNSC staff concurred with OPG's request for Fire Protection Acceptable Deviations and Alternate Compliances related to the Refurbishment project in July of 2015 (e-Doc 4806897). Per CSA N293, CNSC staff have subsequently

provided concurrence to additional fire protection related alternate compliances (e-Docs 5296647, 4996509, 4995266, 4994520, 4982486, 4950896, 4940772).

Fire Response

As required by CSA N293, a review of the Industrial Fire Brigade (IFB) governance and performance shall be included in the fire protection program audit described above. The fire protection program 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 NFPA standards referenced therein.

An independent third party auditor is required to be an expert in their 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 total impartiality. The review shall be of sufficient depth and detail that the reviewer can attest with reasonable confidence on the competencies of the IFB at the facility.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Fire Protection	N-PROG-RA-0012	PI
Fire Hazard Assessment of the DNGS Retube Waste Processing Building (RWPB)	NK38-REP-09701-10338	PI

Recommendations and Guidance

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 FPP or the Fire Response exercised (based on the scope of the audit). The report should identify any non-compliance and formulate a conclusion if the licensee's FPP or IFB meets the requirements of CSA 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:

- Scope and objective of the review;
- A list of applicable codes and standards;
- Summary of the review methodology, including areas and documents reviewed;
- Detailed observations or issues that have been identified;
- Conclusion should identify whether the FPP or the IFB response meets applicable requirements, achieves the FPP or IFB response objectives;
- Summary of any non-compliance, recommendations (if any) and the corrective action plan; and

- The report to be signed by the person taking responsibility for the review.

11 SCA – WASTE MANAGEMENT

The safety and control area "Waste Management" 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.

Performance Objective(s)

There is full development, implementation and auditing of a facility- and waste stream- specific waste management program to control and minimize the volume of nuclear waste generated by the licensed activity; waste management is included as a key component of licensee's corporate and safety culture; and a decommissioning plan is maintained.

11.1 Waste Management Program

Licence Condition 11.1:

The licensee shall implement and maintain a waste management program.

Preamble:

The *General Nuclear Safety and Control Regulations* require that a licence application contain information related to the in-plant management of radioactive waste or hazardous waste resulting from the licensed activities.

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances.

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 a program for waste management that includes strategies for waste minimization. Low and intermediate level waste shall be managed in accordance with CSA standard N292.3, *Management of low and intermediate-level radioactive waste*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	Management of low and intermediate-level radioactive waste	N292.3	2014 (Reaffirmed 2019)	2024-12-04
CSA	General principles for the management of radioactive waste and irradiated fuel	N292.0	2019 (Reaffirmed 2024)	2024-12-04
CSA	Storage of Radioactive Waste and Irradiated Fuel	N292.4	2023	2025-03-13

Further, as communicated in OPG letter N-CORR-00531-24041 (e-Doc 7293387), OPG has committed to be compliant with CSA N292.8-21, *Characterization of radioactive waste and irradiated fuel* by 19 December 2025.

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's safety culture; and
- Audit on a regular basis its program to maximize its efficiency.

OPG shall ensure that the Retube Waste Processing Building (RWPB) is operated in accordance with the Darlington Nuclear Generating Station PROL and the applicable documents included below as requiring written notification of change:

- Operations & Maintenance Plan - Retube Waste Processing Building
- RWPB Safety Analysis Summary Report (see LC 4.1)
- Darlington Retube Waste Processing Building – Safety Assessment (see LC 4.1)
- RWPB Worker Dose During Normal Operation and Under Accident Conditions (see LC 4.1)
- Fire Hazard Assessment of the DNGS Retube Waste Processing Building (RWPB) (see LC 10.2)

The following documents require written notification of change:

Document Title	Document #	Notification Status
Environment Health and Safety Managed Systems	OPG-PROG-0005	TI
Management of Waste and Other Environmentally Regulated Materials	OPG-STD-0156	TI
Segregation and Handling of Radioactive Waste	N-PROC-RA-0017	TI

Document Title	Document #	Notification Status
Operations & Maintenance Plan - Retube Waste Processing Building	NK38-PLAN-09701-10293	PI
Retube Waste Processing Building Safety Analysis Summary Report	NK38-REP-09701-10344	PI
Darlington Retube Waste Processing Building - Safety Assessment	NK38-REP-09701-10326	PI
RWPB Worker Dose During Normal Operations and Under Accident Conditions	NK38-CORR-09701-0597849	PI
Fire Hazard Assessment of the DNGS Retube Waste Processing Building (RWPB)	NK38-REP-09701-10338	PI

Recommendations and 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 Program for Planning the Decommissioning of the Nuclear Facility

Licence Condition 11.2:

The licensee shall implement and maintain a decommissioning plan.

Preamble:

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed plan for decommissioning of the nuclear facility.

The decommissioning plan includes strategies for the management of low and intermediate level waste, reactor and waste storage facility decommissioning, and the used fuel arising from the operation of the nuclear facility.

Compliance Verification Criteria:

CSA standard N294, *Decommissioning of facilities containing nuclear substances,* provides direction on the decommissioning of licensed facilities and specifies requirements for the planning, preparation, execution and completion of decommissioning.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CSA	Decommissioning of facilities containing nuclear substances	N294	2019	2021-12-31
CNSA	Waste Management, Volume I: Management of Radioactive Waste	REGDOC-2.11.1	2021	2024-12-04

The following documents require written notification of change:

Document Title	Document #	Notification Status
Decommissioning Program	W-PROG-WM-0003	PI
Darlington Nuclear Site Preliminary Decommissioning Plan	NK38-PLAN-00960-10001	PI

CNSC REGDOC-2.11.2, *Decommissioning*, was published in January 2021. As detailed in OPG letter NK38-CORR-00531-25234 (e-Doc 7245645), OPG will implement REGDOC-2.11.2 at Darlington NGS by 30 December 2027, and reflect this implementation in the next decommissioning plan.

The decommissioning plan shall be kept current to reflect any changes in the site or nuclear facility. The decommissioning plan shall be revised at a minimum every five years, unless specified otherwise by the Commission. NK38-PLAN-00960-10001, *Darlington Nuclear Site Preliminary Decommissioning Plan*, will be revised and submitted to the CNSC by 31 January 2027.

Recommendations and Guidance:

This section has no contents applicable to this LC.

12 SCA – SECURITY

The safety and control area "Security" covers the programs required to implement and support the security requirements stipulated in the *Nuclear Security Regulations*, the licence, orders, or expectations for the facility or activity.

Performance Objective(s)

Loss, theft or sabotage of nuclear material or sabotage of the licensed facility are prevented.

12.1 Nuclear Security Program

Licence Condition 12.1:

The licensee shall implement and maintain a security program.

Preamble

The *General Nuclear Safety and Control Regulations* require that a licence application contain information related to site access control and measures to prevent loss or illegal use, possession or removal of the nuclear substance, prescribed equipment or prescribed information.

The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed measures to prevent acts of sabotage or attempted sabotage at the nuclear facility.

The *Nuclear Security Regulations* require that a licence application contain specific information related to nuclear security, stipulates the requirements for High-Security Sites, and contains specific requirements pertaining to the transportation of Category I, II or III nuclear material.

The *Nuclear Security Regulations* require that a licensee of a high security site:

- Maintain at all times a qualified onsite nuclear response force;
- Obtain the applicable certifications, before issuing an authorization to a nuclear security officer;
- Prevent unauthorized removal of nuclear material;
- Prevent and detect unauthorized entry into a protected area or inner area; and
- Prevent unauthorized entry of weapons and explosive substances into a protected area or inner area.

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 upon request (within 60 days) after completion of the assessment.

CNSC regulatory document REGDOC-2.12.1, *High Security Facilities, Volume I: Nuclear Response Force,* 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.

Compliance Verification Criteria

The licensee shall implement and maintain programs to ensure security of the nuclear facility. These programs shall comply with the requirements set out in CNSC regulatory documents:

- CNSC regulatory document REGDOC-2.12.1, *High Security Facilities, Volume I: Nuclear Response Force*;
- CNSC regulatory document REGDOC-2.12.1, *High-Security Sites, Volume II: Criteria for Nuclear Security Systems and Devices*;
- CNSC regulatory document REGDOC-2.12.2, *Site Access Security Clearance*;
- CNSC regulatory document REGDOC-2.2.4, *Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	High Security Facilities, Volume I: Nuclear Response Force*, Version 2*	REGDOC-2.12.1, Volume I	2018	2020-12-31
CNSC	High-Security Sites, Volume II: Criteria for Nuclear Security Systems and Devices	REGDOC-2.12.1, Volume II	2018	2024-03-19
CNSC	Site Access Security Clearance	REGDOC-2.12.2	2013	2016-01-01
CNSC	Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness	REGDOC-2.2.4	2018	2020-12-31
CNSC	Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1	REGDOC-2.12.3	2020	2024-03-19
CSA	Cyber security for nuclear power plants and small reactor facilities	N290.7	2014 (Reaffirmed 2021)	2019-11-30

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 their 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.

All detection devices shall be installed, operated and maintained in accordance with manufacturers' specifications and meet the criteria in REGDOC-2.12.1, Volume II .

The licensee shall, in accordance with REGDOC-2.2.4, ensure that 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.

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.

Cyber Security

The licensee's cyber security program shall be designed, implemented, and maintained to protect the cyber essential assets (CEAs) that perform or impact nuclear safety, nuclear security, emergency preparedness, or safeguard functions from cyber attacks.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Darlington Nuclear Generating Station Security Report	8300-REP-61400-10003	PI
Darlington Nuclear Security Tactical Plan	8300-PLAN-61400-10012	PI
Nuclear Security	N-PROG-RA-0011	PI
Darlington Nuclear Generating Station and Nuclear Sustainability Services - Darlington - Harmonized Threat Vulnerability and Risk Assessment	NK38-REP-08160.3-00001	TI
Cyber Security	N-PROC-RA-0135	TI
Cyber Essential Asset Identification and Classification	N-STI-08161-10017	TI
Cyber Security Controls for Cyber Essential Assets	N-INS-08161-10011	TI
Cyber Security	OPG-PROG-0042	TI

Recommendations and Guidance

CNSC guidance document G-274, *Security Programs for Category I or II Nuclear Material or Certain Nuclear Facilities,* provides guidance for preparing, submitting and revising the Station Security Report.

CNSC guidance document G-208, *Transportation Security Plans for Category I, II, or III Nuclear Material,* provides guidance to the licensee on how to prepare and submit a "written transportation security plan".

Guidance may be obtained in the IAEA Nuclear Security Series No. 4, *Technical Guidance: Engineering Safety Aspects of the Protection of Nuclear Power Plants Against Sabotage,* IAEA Nuclear Security Series No.13, *Recommendations: Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5),* and IAEA Nuclear Security Series No. 17, *Technical Guidance: Computer Security at Nuclear Facilities*.

13 SCA – SAFEGUARDS AND NON-PROLIFERATION

The safety and control area "Safeguards and Non-Proliferation" covers the programs required for the successful implementation of the obligations arising from the Canada/IAEA Safeguards Agreement, as well as all other measures arising from the *Treaty on the Non-Proliferation of Nuclear Weapons*.

Performance Objective(s)

Conformity with measures required by the facility to meet Canada's international safeguards obligations through:

- Timely provision of accurate reports and information;
- Provision of access and assistance to IAEA inspectors for verification activities;
- Submission of annual operational information and accurate design information of plant structures, processes and procedures;
- Development and satisfactory implementation of appropriate facility safeguards procedures; and
- Demonstration of capability, as confirmed through CNSC onsite evaluations, to meet all requirements in support of physical inventory verifications of nuclear material by the IAEA.

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 IAEA in order to evaluate a Member State's compliance with its obligations pursuant to its safeguards agreements with the IAEA.

The *General Nuclear Safety and Control Regulations* require the licensee to take all necessary measures to facilitate Canada's compliance with any applicable safeguards agreement, and defines reporting requirements for safeguards events.

The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the licensee's proposed measures to facilitate Canada's compliance with any applicable safeguards agreement.

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 that 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 non-proliferation activities carried out under this licence is limited to tracking and reporting of foreign obligations and origins of nuclear material. 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 the *General Nuclear Safety and Control Regulations*.

Compliance Verification Criteria

The licensee shall ensure that accounting and reporting of nuclear materials is carried out in accordance with CNSC regulatory document REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy*.

Relevant documents that require version control:

Source	Document Title	Document #	Revision #	Effective Date
CNSC	Safeguards and Nuclear Material Accountancy	REGDOC-2.13.1	2018	2021-10-25

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, OPG is to contact the CNSC International Safeguards Division (safeguardsofficial-garantiesofficiel@cnsc-ccsn.gc.ca) to inform them of the issue and to seek guidance on how to fulfill reporting requirements. When OPG inventory change documents and physical-key measurement point inventory summaries are submitted using an alternative method, OPG 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 6032545.

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 CNSC staff as follows:

- Director, International Safeguards Division;
- Director General, Directorate of Security and Safeguards;
- Vice-President, Technical Support Branch; and
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch.

With respect to the implementation of safeguards measures, changes made by the licensee to operation, equipment or procedures as of the result of agreement between the licensee, the CNSC and the IAEA are considered routine.

If a requested change would adversely impact Canada's compliance 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.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Safeguards and Nuclear Material Accountancy	N-PROG-RA-0015	PI
Safeguards and Nuclear Material Accountancy Implementation	N-STD-RA-0024	PI
OPG Safeguards and Nuclear Material Accountancy Requirements	N-PROC-RA-0136	PI

Recommendations and Guidance

This section has no contents applicable to this LC.

14 SCA – PACKAGING AND TRANSPORT

The safety and control area "Packaging and Transport" covers programs for the safe packaging and transport of nuclear substances to and from the licensed facility.

Performance Objective(s)

All radioactive shipments leaving the site adhere to the *Packaging and Transport of Nuclear Substances Regulations* and the *Transportation of Dangerous Goods Regulations*.

14.1 Packaging and Transport Program

Licence Condition 14.1:

The licensee shall implement and maintain a packaging and transport of nuclear substances program.

Preamble

The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the proposed procedures for transporting nuclear substances.

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 2015).

The *PTNSR* and the *TDGR* provide specific requirements for the design of transport packages, the packaging, marking and labeling of packages and the handling and transport of nuclear substances.

Compliance Verification Criteria

The licensee shall implement and maintain a packaging and transport program that will ensure compliance with the requirements of the TDGR and the PTNSR.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Radioactive Material Transportation	W-PROG-WM-0002	TI
Radioactive Materials Transportation Emergency Response Plan	N-STD-RA-0036	TI

Recommendations and Guidance

This section has no contents applicable to this LC.

15 NUCLEAR FACILITY -SPECIFIC

15.1 Tritium Removal Facility Operations

Licence Condition:

The licensee shall implement and maintain an operations program for the Tritium Removal Facility including a set of operating limits.

Preamble

The Darlington NGS PROL authorizes OPG to operate the Tritium Removal Facility (TRF) housed in the Heavy Water Management Building on the site. Tritium is produced in the moderator and primary heat transport circuit of CANadian Deuterium Uranium (CANDU) reactors. The TRF is designed to reduce levels of radioactive tritium from these heavy water (deuterium oxide, D_2O) inventories. This in turn reduces the potential radiation exposure of licensee staff and reduces releases to the environment. The systems of the TRF have been designed to perform three primary functions: tritium extraction, tritium immobilization/storage and tritium clean up.

In addition to reducing tritium levels in Darlington NGS heavy water inventories, the TRF is also used to reduce tritium levels in heavy water inventories from the other Canadian NPPs.

Compliance Verification Criteria

The licensee shall ensure that the operation of the TRF is addressed in the operating policies and principles (OP&Ps).

The licensee shall ensure that the concentration of tritium in any tritiated deuterium oxide feedstock to be treated in the Darlington TRF does not exceed 1.26 TBq/kg D_2O (34 Ci/kg D_2O).

D-INS-39000-10003, *Tritium Removal Facility Planned Outage Management* is specific to managing outages in the TRF. While this document takes its authority from N-PROC-MA-0013, *Planned Outage Management* (listed under LC 6.1), the document also takes into account the specific nature and timing of TRF outages, allowing OPG to achieve a higher degree compliance with their own documentation.

Condition assessments of the TRF conducted by the OPG indicate that detritiation capacity may be extended to 2055 to match the end of extended life of Darlington NGS, instead of the currently expected end of design life in 2025. As per correspondence NK38-CORR-00531-21141 (e-Doc 6031691), dated 28 October 2019, OPG has elected to extend the operational life of the TRF beyond 2025, by undertaking refurbishment activities over a series of extended outages commencing in 2025.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Operating Policies and Principles	NK38-OPP-03600	PI
Tritium Removal Facility Planned Outage Management	D-INS-39000-10003	TI
Heavy Water Management	N-PROG-AS-0008	TI

Recommendations and Guidance

This section has no contents applicable to this LC.

15.2 Refurbishment - Return to Service

Licence Condition:

The licensee shall implement a return to service plan for refurbishment.

Preamble

Reactor units will be removed from service for replacement of internal reactor components and other activities that can only be accomplished in a "refurbishment" outage. Refurbishment outages differ from planned maintenance outages in that the duration is longer, work activities are more complex, and the configuration of the unit is significantly altered to allow work to proceed.

Return to service (RTS) involves returning the reactor and associated nuclear and non-nuclear systems to commercial operation. The licensee must demonstrate that all regulatory requirements have been met and that the associated work has been done to the satisfaction of the CNSC.

Compliance Verification Criteria

The licensee's Return to Service Program Management Plan, NK38-NR-PLAN-09701-10001, Sheet: 0003, describes the processes, procedures, and organization that will be used during the Darlington Refurbishment Project to manage the modification and restart activities.

This plan identifies OPG internal restart control hold points (RCHPs) that will be the focus of the run-up activities leading up to full power and unit availability for commercial operation. For each RCHP, the licensee will produce a Completion Assurance Document (CAD) which provides confirmation that all pre-requisites, modification commissioning, testing, system restart activities and commitments have been addressed to the allow OPG's release of the specific hold point. The CAD will include references to the following reports with detail applicable to the specific activities associated with the RCHP:

- Construction Completion Declarations:
  - Confirm that construction and installation activities are sufficiently complete and that it is safe to proceed with modification commissioning and re-start testing on the affected SSCs.
- Modification Commissioning Reports:
  - Confirm that new or modified SSCs meets the design specifications and performance criteria.
- System Available for Service Packages:
  - Confirm that individual systems, or a group of systems, can be credited to safety and reliability perform their design functions.
- Re-start Testing:
  - Confirm that functional tests and system-level tests have been completed to confirm that non-modified SSCs are ready to return to normal operation after the refurbishment outage.
- Unit Readiness for Service Packages:

- Confirm that each unit is returned to service in a manner which demonstrates that new and existing plant SSCs conform to the defined physical, function, performance, safety and control requirements.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Darlington Refurbishment Return to Service Program Management Plan	NK38-NR-PLAN-09701-10001, Sheet: 0003	TI
Engineering Change Control Process	N-PROC-MP-0090	PI

Recommendations and Guidance

OPG should apply the concepts described in REGDOC-2.3.1, *Conduct of Licensed Activities: Construction and Commissioning Programs*, to the extent practicable, when commissioning and returning SSCs to service. CNSC staff will consider pertinent sections of REGDOC-2.3.1 when evaluating OPG's commissioning and return to service activities related to the refurbishment.

OPG and CNSC staff have bilaterally issued Return to Service (RTS) protocols intended to manage prerequisites for Regulatory Hold Point (RHP) removal and for production of certain deliverables by both parties, to obtain certainty around the schedule and scope and management of anticipated changes to deliverables associated to a refurbished Unit's RTS.

The scope of work specified in the RTS protocols have been based on this Licence Conditions Handbook and agreed to with CNSC staff for implementation for refurbished Units' RTS.

The RTS protocols detail the administrative process to be used between the CNSC and OPG to manage the regulatory interaction for the listed deliverables in Appendix B of the protocols that comprise the assurance CNSC seeks as defined in this LCH for removal of the RHPs referenced in License Condition 15.4 of the Darlington PROL.

15.3 Integrated Implementation Plan

Licence Condition:

The licensee shall implement the Integrated Implementation Plan.

Preamble

The Integrated Implementation Plan (IIP) contains commitments, including the timeframes for implementation, resulting from the Environmental Assessment (EA) for Darlington Refurbishment and Continued Operations as well as the Darlington Integrated Safety Review (ISR). These commitments include, but are not limited to:

- Replacement of fuel channels, feeders, calandria tubes, and end fittings;
- Installation of two auxiliary shutdown cooling pumps per unit;
- Installation of a containment filtered venting system;
- Provision of shield tank overpressure protection;
- Enhancements to the powerhouse steam venting system;
- Installation of a 3rd emergency power generator;
- Provision of an alternate, independent supply of water as an emergency heat sink;
- Implementation of safety related recommendations from component condition assessments; and
- Implementation of mitigation and follow up activities stemming from the Environmental Assessment conducted under the *Canadian Environmental Assessment Act, 1992*.

Compliance Verification Criteria

In implementing the commitments identified in the Darlington ISR IIP, NK38-REP-03680-10185 R004 , *Darlington NGS Integrated Implementation Plan* (e-Doc 7139515), OPG shall provide formal progress reports on the status of all Darlington ISR IIP commitments on an annual basis to CNSC staff by March 31st of each year during the licence period.

In parallel to the Darlington ISR IIP, OPG has also provided an IIP based on the Darlington PSR completed in 2024. OPG is currently implementing NK38-REP-03680-11940-R000, *Darlington NGS Periodic Safety Review (D-PSR): Integrated Implementation Plan* (e-Doc 7125642) in compliance with REGDOC-2.3.3, Periodic Safety Reviews. As with the ISR IIP, OPG shall provide formal progress reports on the status of all Darlington PSR IIP commitments on an annual basis to CNSC staff by March 31st of each year during the licence period.

Any proposed non-intent changes to the Darlington IIPs shall be subject to the licensee's IIP Change Control Process Principles (CD# NK38-CORR-00531-16991, e-Doc 4575922); further developed in N-PROC-MA-0109, *Periodic Safety Review*.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Periodic Safety Review	N-PROC-MA-0109	TI

Relevant documents that require version control:

Source	Document Title	Document #	Revision #
CNSC	Periodic Safety Reviews	REGDOC-2.3.3	2015

Recommendations and Guidance

This section has no contents applicable to this LC.

15.4 Regulatory Hold Points for Return to Service and Continued Operations and the Target Delivery System

Licence Condition:

The licensee shall obtain the approval of the Commission, or consent of a person authorized by the Commission, prior to the removal of established regulatory hold points.

Regulatory Hold Points for Return to Service and Continued Operations

Preamble

CNSC selected four (4) regulatory hold points for which CNSC approval will be sought prior to proceeding to the subsequent commissioning phase. These hold points require regulatory verification to confirm operational readiness of the plant safety systems to satisfy regulatory requirements for staged progress through the commissioning phases up to full power operation. These regulatory hold points are consistent with the regulatory approach described in CNSC regulatory document RD-360, *Life Extension of Nuclear Power Plants*.

Compliance Verification Criteria

The licensee shall seek approval of the Commission or consent of a person authorized by the Commission prior to the removal of the following regulatory hold points for the return to service of each unit. The regulatory hold points that mark the completion of the commissioning phases are as follows:

1. Prior to **Fuel Load - Phase A**
2. Prior to removal of **Guaranteed Shutdown State - Phase B**
3. Prior to exceeding **1% Full Power - Phase C**
4. Prior to exceeding **35% Full Power - Phase D**

For each of the regulatory hold points, the licensee shall submit Completion Assurance Documents (CAD). In addition to these CAD's, the licensee shall submit CADs following sustained operation at 100% full power that will specify activities that were completed between 35% and 100% full power. Each CAD shall present evidence that all pre-established conditions for removal have been met.

Prior to GSS removal, all plant personnel who work on the refurbished reactor shall have completed update training appropriate to the knowledge and skill requirements of the applicable position covering the changes to facility systems, equipment and procedures made during refurbishment.

For each ANO, CRSS and SM this includes, at a minimum:

- Principles of reactor operation with new fuel;
- Principles of nuclear safety relevant to the operation of the reactor unit with new fuel;
- Operating constraints and limits associated with the operation of the reactor unit with new fuel;
- The initial approach to criticality and power increase until control by the reactor regulating system is established, including the systems and equipment required and their operation; and

- Changes in fuel composition and core reactivity until reaching equilibrium fuel conditions.

This training shall include formal knowledge and performance evaluations that confirm and document that, at the time of GSS removal, the person has the required knowledge and skills to perform the duties of the applicable position.

Low power testing (Phase C) shall be carried out at the lowest possible power level, with a maximum of 1% of full power.

Pre-requisites for Removal of Hold Points:

Pre-requisites for Fuel Load

1. All IIP commitments required prior to fuel load are complete;
2. All SSCs required for safe operation beyond fuel load are available for service;
3. Staffing levels to safety operate the unit are adequate;
4. Specified operating procedures for fuel load have been formally validated;
5. Specified training for fuel load is complete and staff qualified;
6. Specified SSCs meet the quality and completion requirements of CSA standard N286, *Management system requirements for nuclear facilities*;
7. All non-conformances and open items identified leading up to the fuel load are addressed; and
8. Verification by CNSC staff that all construction, commissioning, re-start, and available for service activities required prior to fuel load have been successfully completed.

With respect to pre-requisite #3: Staffing levels refers to a sufficient number of qualified workers present at all times to ensure the safe operation of the nuclear facility and to ensure adequate emergency response capability. The licensee should have adequate staff available such that absences due to vacation, sick leave and training do not cause violations of the minimum shift complement levels.

Pre-requisites for GSS Removal

1. All IIP commitments required prior to GSS removal are complete;
2. All SSCs required for safe operation beyond GSS removal are available for service;
3. Specified operating procedures for GSS removal have been formally validated;
4. Specified training for GSS removal is complete and staff qualified;
5. All non-conformances and open items identified leading up to GSS removal are addressed;
6. Specified SSCs meet the quality and completion requirements of CSA N286; and
7. Verification by CNSC staff that all construction, commissioning, re-start, and available for s*ervice activities required prior to GSS removal have been successfully completed.*

Pre-requisites for Reactor Power Increases Prior to exceeding 1% Full Power

1. All IIP commitments required prior to increasing reactor power are complete;
2. All SSCs required for safe operation are available for service;
3. Specified operating procedures have been formally validated;
4. Specified training is complete and staff qualified;
5. All non-conformances and open items identified leading up to reactor power increases are addressed;

6. Specified SSCs meet the quality and completion requirements of CSA N286; and
7. Verification by CNSC staff that all construction, commissioning, re-start, and available for service activities required prior to increasing reactor power have been successfully completed.

Pre-requisites for Reactor Power Increases Prior to exceeding 35 % Full Power

1. All IIP commitments required prior to normal operation are complete;
2. All SSCs required for safe operation are available for service;
3. Specified operating procedures have been formally validated;
4. Specified training is complete and staff qualified;
5. All non-conformances and open items identified leading up to reactor power increases are addressed;
6. Specified SSCs meet the quality and completion requirements of CSA N286; and
7. Verification by CNSC staff that all construction, commissioning, re-start, and available for service activities required prior to increasing reactor power have been successfully completed.

The licensee's criteria for the removal of hold points are contained in NK38-INS-09701-10006, *Nuclear Refurbishment Unit Readiness for Service Process*.

The following documents require written notification of change:

Document Title	Document #	Notification Status
Nuclear Refurbishment Unit Readiness for Service Process	NK38-INS-09701-10006	PI

Recommendations and Guidance

OPG and CNSC staff have bilaterally issued Return to Service (RTS) protocols intended to manage prerequisites for Regulatory Hold Point (RHP) removal and for production of certain deliverables by both parties, to obtain certainty around the schedule and scope and management of anticipated changes to deliverables associated to a refurbished Unit's RTS.

The scope of work specified in the RTS protocols have been based on this License Conditions Handbook and agreed to with CNSC staff for implementation for a refurbished Unit's RTS.

The RTS protocols detail the administrative process to be used between the CNSC and OPG to manage the regulatory interaction for the listed deliverables in Appendix B of the protocol that comprise the assurance CNSC seeks as defined in this LCH for removal of the RHPs referenced in License Condition 15.4 of the Darlington PROL.

The RTS protocol for Unit 4 is defined in *Ontario Power Generation Protocol with the Canadian Nuclear Safety Commission for Darlington Nuclear Generating Station Unit 4 Return to Service*, e-Doc 7064148.

The operating procedures to be validated and the staff training to be completed are specified in the RTS protocols.

Objective evidence should be provided to support the confirmation that SSCs meet the quality and completion requirements of CSA N286, including Design, Engineering, Procurement, Construction, Installation and Implementation activities are complete, their results deemed safe for the intended use and their respective critical characteristics and requirements have been met.

Regulatory Hold Points for the Target Delivery System

Preamble

In the 2025 Record of Decision for Lu-177 and Y-90 production,[2] the Commission established a regulatory hold point (RHP), prior to OPG declaring the production of the new isotopes available for service. The RHP requires CNSC staff verification to ensure that OPG has completed all required actions.

The Commission has delegated the authority for the removal of the regulatory hold points to either of the following:

- Executive Vice-President and Chief Regulatory Operations Officer
- Director General of the Directorate of Power Reactor Regulation

Compliance Verification Criteria

In accordance with the 2025 Record of Decision for the Y-90 and Lu-177related Darlington licence amendment, the licensee shall seek approval to remove the Commission defined regulatory hold point (RHP). To commercially produce Y-90 or Lu-177 using the TDS on Unit 2, the only unit authorized to have a TDS installed, the RHP established by the Commission shall be removed prior to declaring the production of the new isotopes available for service. **Note**: OPG is not precluded from producing Y-90 or Lu-177 in support of planned commissioning activities.

Removal of the RHP may be recommended by CNSC staff when OPG:

1) Demonstrates that all actions are complete in accordance with CMD-25-H100.
2) Demonstrates that all appropriate OPG approvals have been issued
3) Demonstrates that any safety significant action items have been addressed

Process to remove regulatory hold points

The process for the removal of the regulatory hold point is as follows:

[2] Document ID: DAMZHJW66V33-166150894-1608

1) The licensee submits a request to CNSC staff for the removal of the hold point. The licensee's request must include sufficient information to demonstrate that all pre-requisites have been satisfied.
2) CNSC staff will review the submitted information and verify the licensee's compliance with regulatory requirements and commitments.
3) Based on the submitted information, CNSC staff will provide a report, including recommendations, to the Delegated Authority specified by the Commission, regarding whether the pre-requisites, specified in the LCH, have or have not been met.
4) The Delegated Authority specified by the Commission will then consent or not consent to the removal of the requested regulatory hold point.
5) CNSC staff will administer the removal of the hold point through a confirmation letter to the licensee.

Recommendations and Guidance

OPG and CNSC staff will bilaterally issue a Lu-177 and Y-90 protocol intended to manage the prerequisites for RHP removal and for production of certain deliverables by both parties, to obtain certainty around the schedule and scope of these deliverables.

15.5 Import and Export of Nuclear Substances

Licence Condition:

The licensee shall limit the activities of import and export of nuclear substances to those occurring as contaminants in laundry, packaging, shielding or equipment.

Preamble

OPG is authorized to import and export nuclear substances other than controlled nuclear substances as defined in the *Nuclear Non-Proliferation Import and Export Control Regulations*. The nuclear substances are materials consisting primarily of contaminated laundry originating from Darlington NGS. In addition to contaminated laundry, the licence condition allows for import and export of packaging, shielding or equipment with low levels of contamination similar to laundry.

Compliance Verification Criteria

The following documents require written notification of change:

Document Title	Document #	Notification Status
Radioactive Material Transportation	W-PROG-WM-0002	TI
Radiation Protection	N-PROG-RA-0013	PI

The licensee shall limit the activities of import and export of nuclear substances to the isotopes and quantities listed in Table 1 as follows:

Table 1: Nuclear Substances and Quantity Limits for Import and Export

Nuclear Substance	Maximum Total Quantity
Americium 241	10 MBq
Antimony 122	10 GBq
Antimony 124	50 GBq
Antimony 125	20 GBq
Carbon 14	10 GBq
Cerium 141	1 GBq
Cerium 144	1 GBq
Cesium 134	1 GBq
Cesium 137	5 GBq
Chromium 51	50 GBq

Nuclear Substance	Maximum Total Quantity
Cobalt 57	10 MBq
Cobalt 58	100 MBq
Cobalt 60*	50 GBq
Curium 242	1 MBq
Curium 244	100 kBq
Deuterium	350 mg
Europium 154	50 MBq
Europium 155	50 MBq
Gadolinium 153	100 MBq
Gadolinium 159	500 MBq
Hafnium 181	10 MBq
Hydrogen 3	10 GBq
Iodine 129	200 kBq
Iodine 131	2 MBq
Iodine 133	2 MBq
Iron 55	10 GBq
Iron 59	50 GBq
Lanthanum 140	1 MBq
Manganese 54	5 GBq
Manganese 56	5 GBq
Molybdenum 99	1 MBq
Neptunium 237	1 kBq
Neptunium 239	500 kBq
Nickel 59	200 MBq
Nickel 63	500 MBq
Niobium 94	10 MBq
Niobium 95	5 GBq
Plutonium 238	1 MBq
Plutonium 239	50 MBq
Plutonium 240	1 MBq

Nuclear Substance	Maximum Total Quantity
Plutonium 241	58 MBq
Promethium 147	50 MBq
Ruthenium 103	1 GBq
Ruthenium 106	1 GBq
Scandium 46	50 MBq
Silver 108m	100 kBq
Silver 110m	10 MBq
Strontium 89	5 MBq
Strontium 90	10 MBq
Tantalum 182	50 kBq
Tin 113	50 MBq
Tungsten 187	1 MBq
Uranium 234	1 kBq
Uranium 235	1 kBq
Uranium 238	10 kBq
Zinc 65	5 MBq
Zirconium 93	100 GBq
Zirconium 95	100 GBq

** The Co-60 limits prescribed in this table do not pertain to packaging and transport of Co-60 produced through the irradiation of Co-59 Adjuster Absorber Rods*

The licensee is not authorized, subject to any restrictions or exemptions under the regulation, to import or export the items described in Parts A and B of the Schedule to the *Nuclear Non-Proliferation Import and Export Control Regulations*, such as:

(1) Special fissionable material, as described in paragraph A.1.1:

(i) Plutonium;

(ii) Uranium 233;

(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;

(x) Radium 223; and

(6) Radium-226, as described in paragraph B.1.1.16.

Recommendations and Guidance

This section has no contents applicable to this LC.

15.6 Target Delivery System Operation Program

Licence Condition:

The licensee shall implement and maintain an operations program for the use of the Target Delivery System to produce the radionuclides described in section IV (vi) (2).

Preamble

The PROL authorizes OPG to *possess, transfer, package, manage and store Y-90, Mo-99, and Lu-177 (including associated decay radionuclides)*. Using the Target Delivery System, OPG is only authorized to produce Y-90, Mo-99, and Lu-177 from Y-89, Mo-98, and Yb-189, respectively at Darlington NGS Unit 2. Units 1, 3, and 4 do not produce Mo-99 as OPG has not established a Commission approved safety case for aTDS designed for these units.

Reactor units at Darlington NGS have eight of the original 24 adjuster rods permanently locked out of core. OPG has modified 4 of these out-of-service Adjuster Rod Ports (31780-AA1, AA8, AA17, and AA24) on Unit 2 by removing the adjuster rod assemblies, and installing target elevators that raise and lower molybdenum targets into and out of the core. The TDS interfaces with numerous existing systems including instrument air and class III & IV electrical power, and forms part of the containment boundary. Redundant, interlocked containment valves are used on both the inboard and outboard side of the target airlock to ensure the containment boundary is maintained at all times.

Compliance Verification Criteria

LC 15.6 provides the basis for regulatory oversight related to the licensed activity associated with the Mo-99 radioisotope production program. The Darlington PROL authorizes the production and possession of various radionuclides through normal commercial operations (*i.e., fission products and their associated decay products produced in* CANDU fuel) and through operation of the TDS at Darlington NGS – Unit 2. Only radionuclides produced with the TDS may be harvested, packaged, and transported off-site under the provisions of this licence condition.

All activities associated with the operation of the Mo-99 IIS / TDS and flask handling are required to be integrated into the management system framework.

The process for removing Regulatory Hold Points established by the Commission related to the TDS are discussed in section 15.4 of this LCH.

Operation of the TDS

In accordance with the Record of Decision,[3] the Commission has limited OPG to installing and operating the TDS on Unit 2 at Darlington NGS. OPG has been directed to return to the Commission if it wishes to install a TDS on additional units at Darlington NGS.

[3] Record of Decision for Application by Ontario Power Generation Inc. for the Application to Amend the Power Reactor Operating Licence PROL 13.02/2025 to Authorize the Production of Molybdenum-99 at the Darlington Nuclear Generating Station, Date of Decision October 26, 2021. CNSC. 2021. e-Doc 6667685.

Due to the first-of-a-kind nature of the Mo-99 IIS design and to allow the public additional opportunity to participate, the Commission directs that OPG must obtain the approval of the Commission, rather than concurrence from CNSC staff, if it means to produce Mo-99 in a unit other than Unit 2.

The licensee shall operate the Mo-99 IIS / TDS in accordance with NK38-OM-30550, *Target Delivery System (TDS)*; the operating parameters therein; and all associated operating procedures, including NK38-MMP-30550-13, *Target Delivery System Transport Package Flasking*. Operation is bounded by the conditions and reactor states assessed in N-REP-03500-0839983, *Integrated Nuclear Safety and Operational Assessment of the Target Delivery System in Darlington*.

As required by REGDOC-3.1.1, deviations from established operating parameters, equipment configuration, predicted consequences of operation and unexpected RRS interactions, should be considered reportable under clauses D-14 or D-18.

Managing Packaged Radionuclides

OPG shall follow the operating manual NK38-OM-30550 and the relevant associated procedures when managing radionuclide production using the TDS. Applicable requirements regarding the preparation and shipment of radionuclides off-site, in accordance with Transport Canada *Transportation of Dangerous Goods Regulations* and CNSC *Packaging and Transport of Nuclear Substances 2015 Regulations* shall be met before transferring radionuclides and shipping them off-site.

At all times, radionuclides produced and harvested using the TDS on Unit 2 are required to be stored in a certified transport flask. All other uses and storage practises are prohibited. When flasking, hoisting, managing, and storing[4] radionuclides using the TDS (effectively sealed sources), OPG shall follow NK38-MMP-30550-13, *Target Delivery System Transport Package Flasking,* and the relevant associated procedures under OPG's Radiation Protection Program and Nuclear Security program.[5]

Licensed Activities

Prohibition of Use of Radionuclides Produced with the TDS and Associated Decay Radioisotopes

The licensee is not authorized by the licence to conduct activities related to nuclear medicine; therefore, OPG is prohibited to process radionuclides produced with the TDS and 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.

The following documents require written notification of change:

[4] In the event where transportation to remove the flask from Darlington NGS is unavailable, the alternative location for the storage of the flask will be at Combustible Material Storage (CMS) D-22-0004. In accordance with OPG correspondence NK38-CORR-00531-23164; e-Doc 6722668, this location has been designated for contingency storage of a loaded transportation flask containing irradiated targets.
[5] Implementing the requirements of REGDOC-2.12.3, *Security of Nuclear Substances: Sealed Sources*

Document Title	Document #	Notification Status
Target Delivery System (TDS)	NK38-OM-30550	TI
Target Delivery System Transport Package Flasking	NK38-MMP-30550-13	TI
Integrated Nuclear Safety and Operational Assessment of the Target Delivery System in Darlington	N-REP-03500-0839983	TI*

**Until the Darlington Analysis of Record or Safety Report is updated to reflect the addition of the TDS on Unit 2*

Recommendations and Guidance

This section has no contents applicable to this LC.

15.7 Cobalt-60 Operations Program

Licence Condition:

The licensee shall implement and maintain a Co-60 operations program for the activities described in part IV of the licence.

Preamble

This LC provides basis for regulatory oversight of activities associated with the production of Cobalt-60 (Co-60). OPG is authorized to produce Cobalt-60 at Darlington NGS Units 1 to 4. Irradiated AA rods containing Co-60 are disassembled and packaged in the irradiated fuel bay and shipped off-site to a processing facility. OPG is under contractual obligation to take back the spent Co-60 that has reached the end of its service life. Prior to the spent Co-60 being returned to OPG, it is expected to spend 25-30 years of cooling in the Irradiated Fuel Bay of Bruce B (LC 15.10 of the Bruce Power Licence and LCH). Following this cool-down period, the spent Co-60 arrives at an OPG licenced waste management facility in form of sealed sources and will be transferred to dry storage.

Compliance Verification Criteria

OPG intends to document the procedures and operating instructions for Co-60 harvests, disassembly and packaging, and flask handling in the following documents requiring notification of change. These documents have not yet been prepared and will need to be finalized and reviewed by CNSC staff prior to use. In the licensing proceeding 24-H101, OPG's commitment to the Commission identified REGM 28252894 which tracks submission of the Darlington NGS Co-60 operating manual and procedures to CNSC staff by August 29, 2025. Despite the delay, OPG's documentation shall be consistent with the information submitted to the Commission during the establishment of the licensing basis for the authorized activity to produce, possess, transfer, use, package, manage and store nuclear substances that are required for, associated with, or arise from the activities associated with the production of: (1) Co-60.

Licensee Documents that Require Notification of Change		
Document #	**Title**	**Prior Notification**
NK38-OM-31935-10001	Cobalt Harvest and Processing system - Table of Contents / Revision History	TI
NK38-CTP-31935-10001	CAEPS – Cobalt Processing Instructions	TI
NK38-OM-31935-10001 04.03.14	Cobalt Handling	TI

When managing Cobalt-60 produced at Darlington NGS Units 1 to 4 OPG shall follow the operating manual NK38-OM-31935-10001 and the relevant associated procedures. OPG's safety case is only valid for 3.5 years of irradiation.

Applicable requirements set out in the Transport Canada *Transportation of Dangerous Goods Regulations* and in the CNSC *Packaging and Transport of Nuclear Substances Regulations* shall be met before transferring Cobalt-60 and shipping it off-site.

Cobalt-60 sealed sources are recorded in the CNSC database (the Sealed Source Tracking System) that tracks the location of each significantly hazardous radioactive source (IAEA Category 1 and 2 sources) in Canada.

The licensee shall submit a report in writing within 48 hours of any receipt of a Cobalt-60 sealed source with an activity equal to, or greater than, 0.3 TBq in accordance with the requirements of REGDOC-3.1.1 (LC 3.3) under Situation/Event No. 25 in Appendix A. The report shall be submitted to the CNSC in accordance with standard communication protocols. The report shall include:

(i) The date of receipt of a transfer,

(ii) The name of the shipper and licence number,

(iii) The address of the shipper's authorized location,

(iv) The nuclear substance,

(v) Activity (radioactivity) (Bq) per source on the reference date,

(vi) The reference date,

(vii) The number of sealed source(s), and

(viii) The aggregate activity (Bq).

Licensed Activities

Prohibition of Use of Co-60

The licensee is not authorized by the licence to conduct activities related to nuclear medicine; therefore, OPG is prohibited to process[6] Co-60 and 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.

Recommendations and Guidance

This section has no contents applicable to this LC.

[6] OPG documentation uses the verb process to describe activities conducted in the IFB which include disassembly the rods, separating the cobalt pencils from the zirconium caps, and cutting / breaking the rods to a length appropriate for the transport flask, but it does not overlap with processing activities that would be authorized under a Nuclear Substance Processing Facility Operating Licence.

APPENDIX A – ADMINISTRATIVE PROCESSES

This appendix describes the administrative process necessary for managing the LCH, such as delegation of authority, change control, reporting to Commission, document version control, record-keeping and dispute resolution.

A.1 Delegation of Authority

Throughout the licence, the statement "or consent of a person authorized by the Commission" reflects to whom the Commission may delegate certain authority (hence "consent") to CNSC staff. Unless otherwise specified, 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:

- DPRR Regulatory Program Directors;
- Director General (DG), Directorate of Power Reactor Regulation (DPRR); and
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch.

Delegations of authority are recorded in the Commission "Record of Proceedings, Including Reasons for Decision", but they may be documented elsewhere by the Commission.

A.2 LCH Change Control

The CNSC will apply a change control process, with clear procedures to the LCH in accordance with the CNSC Management System to ensure that:

- Preparation and use of the LCH is properly controlled;
- All referenced documents are correctly identified and maintained;
- Changes are conducted in accordance with CNSC regulatory policy P-299, *Regulatory Fundamentals*; and
- Procedures for modifying the LCH are followed.

The licensing basis is defined at licence issuance/renewal. The principles for achieving compliance with the licensing basis will not change greatly during the licence period. However, changes to the LCH may be requested by either CNSC staff or the licensee, which impact the specific details of these principles in order to achieve greater clarity and achieve an equivalent level of safety. Whenever CNSC staff request a change to the LCH the licensee will be consulted.

The following are examples of LCH change requests:

- Operating experience with the LCH may reveal instances where the Compliance Verification Criteria text may leave room for varying interpretation between the licensee and CNSC staff, Such instances would require further clarity.
- The transitional provisions for new codes, standards and regulatory documents, which are documented in the compliance verification criteria, may be revised. Assuming that the implementation plan was part of the licence application (and hence part of the licensing basis), such a development would result in a LC non-compliance (reportable in CNSC regulatory document REGDOC-3.1.1, *Reporting Requirements for Nuclear Power Plants*, as such) and CNSC staff modifying the date and taking any necessary other actions, including possible enforcement action, based on the time at risk.
- As a result of a licensing decision being issued by the Commission. (i.e., amendment to the licence). One example is the inclusion of, or revision to, regulatory documents, codes and standards. These amendments may involve amending the CVC in the LCH.
- An Environmental Assessment relevant to the licensed facility may lead to licensee commitments that should be recorded as CVC in the LCH.
- Changes to recommendations and guidance, such as the inclusion or amendment of CNSC regulatory guidance documents or recommendations.

For licensee-requested changes to the LCH, that include the licensee's alternative cost effective approach where applicable, CNSC staff will review the proposed changes, as required by CNSC regulatory policy P-242, *Considering Cost-benefit Information*, and decide if the LCH should be modified. The CNSC document, *Risk Informed Approach for the CNSC Power Reactor Regulatory Program – Basis Document*, contains information on how to consider cost benefit information in licensee submissions.

The Director General, Directorate of Power Reactor Regulation, has the authority to approve changes to the LCH.

In order to effect a modification to the LCH, the CNSC Regulatory Program Officer will:

- Initiate a request using the Document Change Request (DCR) Form;
- Liaise with the Power Reactor Licensing and Compliance Integration Division (PRLCID);
- Coordinate the review by the identified Subject Matter Expert;
- Consult licensee, as required;
- Obtain endorsement from the Regulatory Program Director;
- Obtain approval and signature from the DG of DPRR;
- Update the LCH; and
- Distribute the updated version of the LCH.

If the change involves the revision of a WN document, the Regulatory Program Division will also update the registry it uses to track the version history and e-Doc number of the WN documents.

The Power Reactor Licensing and Compliance Integration Division (PRLCID) will:

- assess if the request is generic to the Power Reactor Regulatory Program;
- endorsement of the change by the PRLCID Director; and
- update the generic LCH, if required.

A.3 Reporting to the Commission

Changes to the LCH will be tracked through the DCR. CNSC staff will summarize all the changes made to the LCH and report them to the Commission for information in the CNSC staff's annual report entitled "Integrated Safety Assessment of Canadian Nuclear Power Plants". This report is presented annually in a public proceeding of the Commission at a scheduled date. The report should emphasize instances where the CVC were relaxed (such as modifying target dates as discussed above).

CNSC staff will review the content of the LCH annually to ensure that the collective changes made to the document did not result in an unauthorized change of scope. For example, CNSC staff will ensure that the LCH continues to maintain a clearly-documented set of compliance verification criteria and that any changes remain within the licensing basis. The results of this review should also be reported to the Commission annually.

A.4 Document Control and Approval/Consent

A.4.1 Document Control and Oversight

Whenever proposed changes to version control documents are accepted by the CNSC, the compliance verification criteria in the LCH must be updated (per the LCH change control process described in Appendix A.2). The Director General, Directorate of Power Reactor Regulation, has the authority to make the changes to the compliance verification criteria as long as the changes remain within the licensing basis.

The CNSC uses a risk-informed process to determine the type of regulatory oversight that is appropriate for each licensee document in the licensing basis. WN documents do not require prior Commission approval or CNSC staff consent of changes, but the changes are still reviewed by CNSC staff. Changes to WN documents are not tracked through the LCH; they are tracked by the CNSC licensing division using the registry described in Section A.2.

A.4.2 Approval/Consent of Changes (other than document changes)

CNSC facility operating licences may include LCs that address situations where the licensee has to apply to make, or at least provide notification before making, a change that is not linked to a specific document. The LCH may also specify similar mechanisms. These situations could include potential design, organizational, or operational changes. The LC or LCH could indicate that the change must be approved by the Commission.

Alternately, the LC or LCH may indicate the circumstances under which consent for the change can be granted by a delegated authority. In some cases, the associated compliance verification criteria in the LCH may indicate specific criteria that the Commission and/or delegated authority would assess when considering the request for approval/consent.

A.4.3 CNSC Review Criteria Related to Document Changes and Approvals/Consent

For the approvals of document changes or other changes described above in Sections A.4.1 and A.4.2, the CNSC checks that the licensee submission includes the appropriate level of information with regards to the proposed changes or action, to the extent relevant:

- A summary description;
- An indication of the duration (temporary or permanent);
- A justification;
- Any relevant supporting documentation;
- An evaluation of the impact on health, safety, security, the environment and Canada's international obligations; and
- An evaluation to determine if the resultant effects remain within the limits defined by the licensing basis.

The CNSC then assesses whether the following general criteria would be met for the proposed change/action:

- The proposed change or action will be made or done in accordance with licensee's quality assurance and change control processes, applicable design guides, design requirements, standards, operating documentation, regulatory documents, applicable safety principles and applicable safeguards agreement.
- Following the proposed change or action, the licensee remains in compliance with the requirements set out in the applicable laws, regulations and licence conditions, including appendices of the licence.
- The proposed change or action is in the safe direction.
- Following the proposed change or action:
    - The licensee remains qualified to carry out the licensed activity;
    - The licensee has adequate provision for the protection of the health and safety of persons, protection of the environment, maintenance of national security and measures required to implement international obligations to which Canada has agreed; and
    - The licensed activity remains within the limits defined by the licensing basis.

(The above criteria can also apply when CNSC staff review a notification of a licensee change that was already made.)

If the licensee's request is being assessed by a delegated authority and it is found that the request for change or action does not meet all of the above criteria, the delegated authority will address the situation with the licensee to determine if adjustments to the proposal can satisfy all the criteria. If not, consideration of the change must be turned from the delegated authority back to the Commission.

A.5 Record Keeping

A.5.1 Records Management

The DCR and accompanying documentation will be archived in Records and referenced in the Revision History section of the LCH. Marked-up documents by the reviewers and any other supporting information will be kept in Records Office (File No. 2.01). Electronic communication related to the change, such as comments from reviewers will be stored in the CNSC's "e-Access."

A.5.2 Distribution

A copy of the updated version of the LCH will be provided to the following:

- Responsible Regulatory Program Director;
- Responsible Site Office;
- Responsible Administrative Assistant; and
- Licensee's single point of contact.

A.6 Dispute Resolution

In the event of disagreement on a proposed change to the LCH, staff and the licensee will attempt to resolve the issue. The following steps will be followed:

- A meeting with the appropriate parties, including Directors, will be scheduled by the Regulatory Program Officer;
- The rationale supporting the decision and the decision will be documented; and
- If any party is not satisfied with the decision, the disagreement will be brought to the next level of authority, Directors General or Vice-Presidents, as required.

Any unresolved issue will be referred to the Commission.

APPENDIX B – GLOSSARY OF TERMS

B.1 – Acronyms

The following is the list of acronyms used in the LCH:

ADL	Administrative Dose limits
AIA	Authorized Inspection Agency
AL	Action Levels
ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineers
CANDU	Canadian Deuterium Uranium
CMD	Commission Member Document
CNSC	Canadian Nuclear Safety Commission
COG	CANDU Owners Group
CSA	Canadian Standards Association
CVC	Compliance Verification Criteria
DBA	Design Basis Accident
DCR	Document Change Request
DG	Director General
DPRR	Directorate of Power Reactor Regulation
DRL	Derived Release Limits
EAL	Environmental Action Levels
EQ	Environmental Qualification
GSS	Guaranteed Shutdown State
IAEA	International Atomic Energy Agency
LCH	Licence Conditions Handbook
LCMP	Life Cycle Management Plans
NDE	Non-destructive Examination
NEW	Nuclear Energy Worker
NFPA	National Fire Protection Association
NGS	Nuclear Generating Station
NPP	Nuclear Power Plant
OP&P	Operating Policies and Principles
OPEX	Operating Experience
OSR	Operational Safety Requirements
PCB	Polychlorinated Biphenyls
PIP	Periodic Inspection Program
PRA	Probabilistic Risk Assessment
PROL	Nuclear Power Reactor Operating Licence
PSA	Probabilistic Safety Assessment
RPD	Regulatory Program Division
SAT	Systematic Approach to Training
SCA	Safety and Control Area
SOE	Safe Operating Envelope
SSCs	Systems, structures and components
WN	Written Notification

B.2 – Definitions

The following is a list of definitions of words or expressions used in the LCH that may need clarification. Unless a reference source is provided in parenthesis, the words or expressions have been defined for the purpose of the LCH.

Accept/ed/able/ance
Meet regulatory requirements, which mean 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 a regulatory requirements set out in applicable laws and regulations;
- Not compliant with a licence condition; and
- Not in the safe direction but the objective of the licensing basis is met.

Boundary conditions
Procedural, administrative rules and operating limits for ensuring safe operation of the facility based on safety analysis. It also includes any applicable regulatory requirements.

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 a regulatory requirements set out in applicable laws and regulations;
- Comply with a licence condition; and
- Not adversely impact the licensing basis.

Defense-in-depth
The application of more than one protective measure for a given safety objective, such that the objective is achieved even if one of the protective measures fails.

Design basis
The range of conditions and events taken into account in the design of the facility, according to established criteria, such that the facility can withstand them without exceeding authorized limits for the planned operation of safety systems.

[CNSC regulatory document RD-360, *Life Extension of Nuclear Power Plants*]

Design basis accident
Accident conditions against which an NPP is designed according to established design criteria, and for which the damage to the fuel and the release of radioactive material are kept within authorized limits.

[CNSC regulatory document RD-310, *Safety Analysis for Nuclear Power Plants*]

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 to 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*]

Human factors engineering
Is the application of knowledge about human capabilities and limitations to plant or facility, system, and equipment design. Human factors engineering ensures that the plant or facility, system, or equipment design, human tasks, and work environment, are compatible with the sensory, perceptual, cognitive, and physical attributes of the personnel who operate, maintain, and support it.

[CNSC guidance document G-276, *Human Factors Engineering Program Plans*]

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, aging 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 which identifies the key components of the finalized critical path, major projects and programs. A level 2 outage plan is a schedule which identifies the system windows with durations.

Licensee documents requiring notification of change
As determined by CNSC staff, these are documents needed to support the licence application which contain the necessary safety and control measures. Depending on the risk significance of the document, changes may require either a "notification" or a "notification prior to implementation".

Program(s)
A documented group of planned activities, procedures, processes, standards and instructions coordinated to meet a specific purpose.

Programmatic failure
A programmatic failure (or programmatic non-compliance), arises under one or more of the following circumstances:

- Failure to establish a required program or program element;
- Failure of a program or program element to meet a mandated standard;
- Failure to comply with a specific, objective provision of a program; and
- Aggravated or systemic failure(s) to adhere to applicable procedures.

[*OPG governance Regulatory Interpretation* CNSC-024]

Probabilistic safety assessment (PSA)
For a NPP or nuclear fission reactor, a comprehensive and integrated assessment of the safety of the plant or reactor. The safety assessment considers the probability, progression and consequences of equipment failures or transient conditions to derive numerical estimates that provide a consistent measure of the safety of the plant or reactor, as follows:

(i) A Level 1 PSA identifies and quantifies the sequences of events that may lead to the loss of core structural integrity and massive fuel failures.
(ii) A Level 2 PSA starts from Level 1 results, and analyses the containment behaviour, evaluates the radionuclides released from the failed fuel and quantifies the releases to the environment.
(iii) A Level 3 PSA starts from the Level 2 results, and analyses the distribution of radionuclides in the environment and evaluates the resulting effect on public health.

A PSA may also be referred to as a Probabilistic Risk Assessment (PRA).

[CNSC standard document S-294, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*]

Qualified Staff
Trained licensee staff, deemed competent and qualified to carry out tasks associated to their respective positions.

Recommendation and Guidance

Non-mandatory suggestions on how to comply with the licence condition. Recommendations and 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.

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.

Safety-related system(s)
A system, including its components and structures that, by failing to perform in accordance with the design intent, has the potential to impact on the radiological safety of the public or plant staff. Safety-related systems are associated with:

(i) The regulation (including controlled startup and shutdown) and cooling of the reactor core under all normal operating and shutdown conditions;
(ii) The regulation, shutdown, and cooling of the reactor core under anticipated transient conditions and accident conditions, and the maintenance of the reactor core in a safe shutdown state for an

extended period following such conditions; and

(iii) Limiting the release of radioactive material and the radiation exposure of plant staff and/or the public in accordance with the criteria established by the regulatory/licensing authority during and following normal, anticipated transient, and accident conditions.

[CSA standard N291-08, *Requirements for safety-related structures for CANDU nuclear power plants*]

Safety significance
Refers to the significance of a discovery/issue with respect to the impact on meeting the fundamental nuclear safety objectives as defined by the IAEA.

In general, a discovery/event has safety significance if it denotes a deviation away from the safety case accepted in the licence, in the direction detrimental to safety, such as:

- Reducing margins to, or exceeding the accepted limits;
- Increasing risk;
- Impairments (various degrees) of the special safety systems or of the safety functions for accident mitigation;
- Human factor issues; and
- Events causing radioactive releases and spills of hazardous substances, injuries to workers**,** public, etc.

[CNSC internal document, *Risk-Informing CNSC Planning, Licensing, and Compliance Activities*]

Version-controlled documents
Refers to documents which require a certain type of CNSC control and are captured in the Document Version Control subsection of the LCH. Such documents include regulatory/industry standards as referenced in the licence (may include regulatory/industry standards which require transition).

Worker
Any person adequately trained to work at the facility covered under the associated operating licence.

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 WN for the proposed changes within a reasonable time (based on the extent of the proposed changes and the potential impact on 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 ALL VERSION-CONTROLLED DOCUMENTS

C.1 – All Canadian Standards Association (CSA) documents referenced in the LCH

Document #	Document Title	Version	L.C.
N286	Management system requirements for nuclear facilities	2012 (Reaffirmed 2022)	1.1 9.1
N290.15	Requirements for the safe operating envelope of nuclear power plants	2019	3.1
N286.7	Quality assurance of analytical, scientific and design computer programs	2016 (Reaffirmed 2021)	4.1
N291	Requirements for safety related structures for CANDU nuclear power plants	2008 (Reaffirmed 2013)	5.1
N290.0	General requirements for safety systems of nuclear power plants	2017 (Reaffirmed 2022)	5.1
N290.12	Human factors in design for nuclear power plants	2014	5.1
N290.14	Qualification of digital hardware and software for use in instrumentation and control applications for nuclear power plants	2015 (Reaffirmed 2020)	5.1
N285.0	General requirements for pressure-retaining systems and components in CANDU nuclear power plants	2008 and update no. 2	5.2
N290.13	Environmental qualification of equipment for CANDU nuclear power plants	2005 and update no. 1 (Reaffirmed 2015)	5.3
N289.1	General requirements for seismic design and qualification of CANDU nuclear power plants	2008 (Reaffirmed 2013)	5.3
N285.4	Periodic inspection of CANDU nuclear power plant components	2014 (2019†)	6.1
N285.5	Periodic inspection of CANDU nuclear power plant containment components	2018	6.1
N285.8	Technical requirements for in-service inspection evaluation of zirconium alloy in pressure tubes in CANDU reactors	2023	6.1
N287.7	In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plant components	2008 (Reaffirmed 2013)	6.1
N288.0	Environmental management of nuclear facilities: Common requirements of the CSA N288 series of Standards	2022	9.1
N288.1	Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities	2014 (Reaffirmed 2019)	9.1

Document #	Document Title	Version	L.C.
N288.8	Establishing and implementing action levels for releases to the environment from nuclear facilities	2017 (Reaffirmed 2022)	9.1
N288.4	Environmental monitoring programs at nuclear facilities and uranium mines and mills	2019	9.1
N288.5	Effluent and emissions monitoring programs at nuclear facilities	2022	9.1
N288.6	Environmental risk assessments at class I nuclear facilities and uranium mines and mills	2012 (Reaffirmed 2017)	9.1
N293	Fire protection for nuclear power plants	2012 and Update No. 1 (R2022)	10.2
N292.3	Management of low and intermediate-level radioactive waste	2014 (Reaffirmed 2019)	11.1
N292.0	General principles for the management of radioactive waste and irradiated fuel	2019 (Reaffirmed 2024)	11.1
N292.4	Storage of Radioactive Waste and Irradiated Fuel	2023	11.1
N294	Decommissioning of facilities containing nuclear substances	2019	11.2
N290.7	Cyber security for nuclear power plants and small reactor facilities	2014 (Reaffirmed 2021)	12.1
N288.3.4	Performance Testing of Nuclear Air-Cleaning Systems at Nuclear Facilities	2013 (Reaffirmed 2022)	9.1
N288.7	Groundwater protection programs at Class I nuclear facilities and uranium mines and mills	2015 (Reaffirmed 2020)	9.1

† Compliance with the 2019 edition is only for the clauses specified under "CVC related to CSA N285.4" in this LCH.

C.2 – All Canadian Nuclear Safety Commission (CNSC) documents referenced in the LCH

Document #	Document Title	Version	L.C.	e-Doc #
N/A	CNSC Financial Security and ONFA Access Agreement and Provincial Guarantee Agreement, effective January 1, 2013	2013	G.5	3501509
REGDOC-3.3.1	Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities	2021	G.5	CNSC Website
REGDOC-3.2.1	Public Information and Disclosure	2018	G.6	CNSC Website
REGDOC-2.1.1	Management Systems	2019	1.1	CNSC Website
REGDOC-2.1.2	Safety Culture	2018	1.1	CNSC Website
REGDOC-2.2.2	Personnel Training, Version 2	2016	2.3 2.4	CNSC Website
REGDOC-2.2.3	Personnel Certification, Volume III: Certification of Reactor Facility Workers	2023 (version 2)	2.1 2.4	CNSC Website
REGDOC-2.2.4	Fitness for Duty: Managing Worker Fatigue	2017	2.1	CNSC Website
REGDOC-2.2.4	Fitness for Duty, Volume II: Managing Alcohol and Drug Use, Version 3	2021	2.1	CNSC Website
REGDOC-2.2.4	Fitness for Duty, Volume III Nuclear Security Officer Medical, Physical, Psychological Fitness	2018	2.1 12.1	CNSC Website
REGDOC-2.3.2	Accident Management, Version 2	2015	3.1	CNSC Website
REGDOC-3.1.1	Reporting Requirements for Nuclear Power Plants, Version 2	2016	3.3	CNSC Website
REGDOC-2.3.3	Periodic Safety Reviews	2015	3.4	CNSC Website
REGDOC-2.4.1	Deterministic Safety Analysis	2014	4.1	CNSC Website
REGDOC-2.4.2	Probabilistic Safety Assessment (PSA) for Nuclear Power Plants	2014	4.1	CNSC Website
REGDOC-2.4.5	Nuclear Fuel Safety and Qualification	2024	4.1	CNSC Website
REGDOC-2.6.1	Reliability Programs for Nuclear Power Plants	2017	6.1	CNSC Website
REGDOC-2.6.2	Maintenance Programs for Nuclear Power Plants	2017	6.1	CNSC Website
REGDOC-2.6.3	Aging Management	2014	6.1	CNSC Website
REGDOC-2.9.1	Environmental Protection: Environmental Principles, Assessments and Protection Measures	2013	9.1	CNSC Website
REGDOC-2.10.1	Nuclear Emergency Preparedness and Response	2016	10.1	CNSC Website
REGDOC-2.11.1	Waste Management, Volume I: Management of Radioactive Waste	2021	11.2	CNSC Website

Document #	Document Title	Version	L.C.	e-Doc #
REGDOC-2.12.1	High Security Facilities, Volume I: Nuclear Response Force*, Version 2*	2018	12.1	Document contains prescribed information
REGDOC-2.12.1	High-Security Sites, Volume II: Criteria for Nuclear Security Systems and Devices	2018	12.1	Document contains prescribed information
REGDOC-2.12.2	Site Access Security Clearance	2013	12.1	CNSC Website
REGDOC-2.12.3	Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1	2020	12.1	CNSC Website
REGDOC-2.13.1	Safeguards and Nuclear Material Accountancy	2018	13.1	CNSC Website

APPENDIX D – LIST OF LICENSEE DOCUMENTS THAT REQUIRE NOTIFICATION OF CHANGE

Document #	Document Title	Notification Requirements	L.C.
GENERAL			
OPG-PROG-0001	Information Management	When implemented	G.2 1.1
NK38-SR-03500-10001	Darlington Safety Report Part 1 and 2	When implemented	G.3 4.1
NK38-D0H-10220-1001	Site and Improvements Site Plan General Arrangement	When implemented	G.3
NK38-D0H-10220-1002	Site Improvements Base Line Plan and Construction Grid	When implemented	G.3
LO4254-DZS-10162-0531	Darlington NGS-A Plant Survey	PRIOR to implementation	G.3
N-STD-AS-0013	Nuclear Public Information and Disclosure	When implemented	G.6
MANAGEMENT SYSTEM			
N-CHAR-AS-0002	Nuclear Management System	PRIOR to implementation	1.1
N-PROG-AS-0001	Nuclear Management System Administration	When implemented	1.1
OPG-PROG-0001	Information Management	When implemented	1.1 G.2
OPG-PROG-0039	Project Management	When implemented	1.1
OPG-PROG-0046	Construction Management	When implemented	1.1
OPG-STD-0140	Managing Change	When implemented	1.1
N-STD-AS-0020	Nuclear Management Systems Organizations	When implemented	1.1
OPG-PROC-0166	Organization Design Change	When implemented	1.1
N-POL-0001	Nuclear Safety & Security Policy	When implemented	1.1
N-STD-AS-0023	Nuclear Safety Oversight	When implemented	1.1
OPG-PROG-0005	Environment Health and Safety Managed Systems	When implemented	1.1
N-PROC-AS-0077	Nuclear Safety & Security Culture Assessment	When implemented	1.1

Document #	Document Title	Notification Requirements	L.C.
N-PROG-RA-0010	Independent Assessment	When implemented	1.1
N-GUID-09100-10000	Contingency Guideline for Maintaining Staff in Key Positions When Normal Station Access is Impeded	When implemented	1.1
OPG-PROG-0033	Business Continuity Program	When implemented	1.1
OPG-PROG-0009	Items and Services Management	When implemented	1.1
HUMAN PERFORMANCE MANAGEMENT			
N-PROC-OP-0047	Hours of Work Limits and Managing Worker Fatigue	PRIOR to implementation	2.1
N-LIST-09110-10005	Listing of Broad Population and Safety Sensitive Job Codes	PRIOR to implementation	2.1
N-PROG-AS-0002	Human Performance	When implemented	2.1
N-STD-AS-0002	Procedure Use and Adherence	When implemented	2.1
N-STD-OP-0002	Communications	When implemented	2.1
N-STD-OP-0004	Self-Check	When implemented	2.1
N-STD-OP-0012	Conservative Decision Making	When implemented	2.1
N-STD-RA-0014	Second Party Verification	When implemented	2.1
N-PROC-OP-0005	Pre-Job Brief / Safe Work Plan and Post-Job Debriefing	When implemented	2.1
N-CMT-62808-00001	Continuous Behaviour Observation Program (CBOP) – Participants Materials – Workbook Components	When implemented	2.1
OPG-PROC-0208	Fitness For Duty: Policy On Managing Alcohol and Drug Use	When implemented	2.1
D-PROC-OP-0009	Station Shift Complement	PRIOR to implementation	2.2
D-INS-09260-10001	Duty Crew Minimum Complement Assurance	PRIOR to implementation	2.2

Document #	Document Title	Notification Requirements	L.C.
N-PROG-TR-0005	Training	When implemented	2.3 2.4
N-PROC-TR-0008	Systematic Approach to Training	When implemented	2.3 2.4
N-INS-08920-10004	Written and Oral Initial Certification Examination for Shift Personnel	PRIOR to implementation	2.4
N-INS-08920-10002	Simulator-Based Initial Certification Examinations for Shift Personnel	When implemented	2.4
N-INS-08920-10001	Requalification Testing of Certified Shift Personnel	When implemented	2.4
N-MAN-08131-10000-CNSC-031	Responsible Health Physicist	PRIOR to implementation	2.4
N-MAN-08131-10000-CNSC-006	Shift Manager, Darlington Nuclear	PRIOR to implementation	2.4
N-MAN-08131-10000-CNSC-010	Authorized Nuclear Operator	PRIOR to implementation	2.4
N-MAN-08131-10000-CNSC-008	Control Room Shift Supervisor – Darlington Nuclear	PRIOR to implementation	2.4
N-MAN-08131-10000-CNSC-025	Unit 0 Control Room Operator	PRIOR to implementation	2.4
OPERATING PERFORMANCE			
NK38-OPP-03600	Operating Policies and Principles	PRIOR to implementation	3.1 3.2 15.1
N-STD-MP-0016	Safe Operating Envelope	PRIOR to implementation	3.1
N-STD-OP-0025	Heat Sink Management	When implemented	3.1
N-STD-OP-0024	Nuclear Safety Configuration Management	When implemented	3.1
N-PROG-OP-0001	Nuclear Operations	When implemented	3.1
N-PROG-OP-0004	Chemistry	When implemented	3.1
N-STD-OP-0012	Conservative Decision-Making	When implemented	3.1
N-STD-OP-0036	Operational Decision Making	When implemented	3.1
N-STD-MP-0019	Beyond Design Basis Accident Management	PRIOR to implementation	3.1 4.1

Document #	Document Title	Notification Requirements	L.C.
N-STD-OP-0011	Operations Performance Monitoring	When implemented	3.1
N-PROC-RA-0035	Operating Experience Process	When implemented	3.1
N-PROC-RA-0022	Processing Station Conditions Records	When implemented	3.1
N-PROG-RA-0003	Performance Improvement	When implemented	3.1
N-STD-OP-0017	Response to Transients	When implemented	3.1 3.2
N-PROG-MP-0014	Reactor Safety Program	When implemented	3.1 3.2 4.1
N-STD-OP-0009	Reactivity Management	When implemented	3.1
N-STD-OP-0021	Control of Fuelling Operations	When implemented	3.1
N-PROG-MP-0014	Reactor Safety Program	When implemented	3.2 3.1
N-STD-OP-0017	Response to Transients	When implemented	3.2 3.1
N-PROC-RA-0005	Written Reporting to Regulatory Agencies	When implemented	3.3
N-PROC-RA-0020	Preliminary Event Notifications	When implemented	3.3
NK38-OSR-08131.02-10001	Darlington Operational Safety Requirements: Emergency Coolant Injection System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10002	Darlington Operational Safety Requirements: Emergency Service Water System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10003	Operational Safety Requirements: Fuel and Reactor Physics	PRIOR to implementation	3.1
NK38-OSR-08131.02-10004	Shutdown Systems	PRIOR to implementation	3.1
NK38-OSR-08131.02-10005	Darlington Operational Safety Requirements: Main Steam Supply System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10006	Darlington NGS: Negative Pressure Containment	PRIOR to implementation	3.1

Document #	Document Title	Notification Requirements	L.C.
NK38-OSR-08131.02-10007	Darlington Operational Safety Requirements: Steam Generator Emergency Cooling System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10008	Darlington NGS Operational Safety Requirements: Moderator System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10009	Operational Safety Requirements: Powerhouse Steam Venting System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10010	Operational Safety Requirements: Reactor Regulating System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10011	Darlington Operational Safety Requirements: Group 1 Service Water Systems	PRIOR to implementation	3.1
NK38-OSR-08131.02-10012	Darlington NGS Emergency Power Supply System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10013	Darlington Operational Safety Requirements: Feedwater System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10014	Darlington Operational Safety Requirements: Shutdown Cooling System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10015	Darlington Operational Safety Requirements: Heat Transport System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10016	Darlington NGS: Group 1 Electrical Power Systems	PRIOR to implementation	3.1
NK38-OSR-08131.02-10017	Darlington Operational Safety Requirements: Toxic Gas Monitoring and MCR Breathing Air	PRIOR to implementation	3.1
NK38-OSR-08131.02-10018	Darlington NGS Operational Safety Requirements: Fuel Handling System and Irradiated Fuel Bays	PRIOR to implementation	3.1
NK38-OSR-08131.02-10019	Darlington NGS Operational Safety Requirements: Powerhouse Steam and Flooding Protective Provisions	PRIOR to implementation	3.1

Document #	Document Title	Notification Requirements	L.C.
NK38-OSR-08131.02-10020	Darlington NGS Operational Safety Requirements: Annulus Gas System	PRIOR to implementation	3.1
NK38-OSR-08131.02-10021	Darlington NGS: Critical Safety Parameter Monitoring Instrumentation	PRIOR to implementation	3.1
NK38-OSR-08131.02-10022	Darlington NGS Operational Safety Requirements: Shield Cooling System	PRIOR to implementation	3.1
NK38-CALC-63432-10001	Darlington NGS ECIS Instrument Uncertainties and Allowable values	PRIOR to implementation	3.1
NK38-CALC-68200-10001	Darlington NGS SDS1 Instrument Uncertainties and Allowable values	PRIOR to implementation	3.1
NK38-CALC-68300-10001	Darlington NGS SDS2 Instrument Uncertainties and Allowable values	PRIOR to implementation	3.1
NK38-CALC-63420-10001	Darlington NPCS Instrument Uncertainties and Allowable values	PRIOR to implementation	3.1
NK38-CALC-63671-10001	Darlington NGS Steam Generator Emergency Cooling System Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-63210-10001	Darlington NGS Moderator System Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-67322-10001	Darlington PSVS Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-63700-10001	Darlington NGS Reactor Regulating System Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-64320-10001	Darlington NGS Feedwater System Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1

Document #	Document Title	Notification Requirements	L.C.
NK38-CALC-63341-10001	Darlington NGS Shutdown Cooling System Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-63330-10001	Darlington HTS Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-67320-10001	Darlington NGS Powerhouse Steam and Flooding Protective Provisions Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-63488-10001	Darlington NGS Annulus Gas System Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-60350-10001	Darlington NGS Critical Safety Parameter Monitoring Instrumentation Uncertainties and Allowable Values	PRIOR to implementation	3.1
NK38-CALC-63411-10001	Darlington NGS Shield Cooling System Instrument Uncertainties and Allowable Values	PRIOR to implementation	3.1
SAFETY ANALYSIS			
NK38-SR-03500-10001	Darlington Safety Report Part 1 and 2	When implemented	4.1 G.3
NK38-SR-03500-10002	Darlington Nuclear 1-4 Safety Report: Part 3- Accident Analysis	When implemented	4.1
NK38-REP-00531.7-10001	Darlington Analysis of Record	When implemented	4.1
N-STD-MP-0019	Beyond Design Basis Accident Management	PRIOR to implementation	4.1 3.1
N-PROG-MP-0014	Reactor Safety Program	When implemented	4.1 3.1 3.2
N-PROC-MP-0086	Safety Analysis Basis and Safety Report	When implemented	4.1
N-PROG-RA-0016	Risk and Reliability Program	When implemented	4.1 6.1
N-STD-RA-0034	Preparation, Maintenance and Application of Probabilistic Safety Assessment	When implemented	4.1

Document #	Document Title	Notification Requirements	L.C.
N-PROG-MP-0006	Software	When implemented	4.1
NK38-REP-09701-10344	Retube Waste Processing Building Safety Analysis Summary Report	PRIOR to implementation	4.1 11.1
NK38-REP-09701-10326	Darlington Retube Waste Processing Building - Safety Assessment	PRIOR to implementation	4.1 11.1
NK38-CORR-09701-0597849	RWPB Worker Dose During Normal Operations and Under Accident Conditions	PRIOR to implementation	4.1 11.1
COG-13-9035-R00	Derived Acceptance Criteria for Deterministic Safety Analysis	PRIOR to implementation	4.1
PHYSICAL DESIGN			
N-STD-MP-0028	Conduct of Engineering	When implemented	5.1
N-PROG-MP-0001	Engineering Change Control	When implemented	5.1
N-STD-MP-0027	Configuration Management	When implemented	5.1
N-PROG-MP-0009	Design Management	When implemented	5.1
N-PROG-MA-0016	Fuel	When implemented	5.1
N-INS-08173-10050	Procurement from Licensed Canadian Nuclear Utilities	When implemented	5.1
N-PROC-MP-0090	Engineering Change Control Process	PRIOR to implementation	5.1 15.2
N-PROG-MP-0004	Pressure Boundary	PRIOR to implementation	5.2
N-PROC-MP-0040	System and Item Classification	PRIOR to implementation	5.2
N-PROC-MP-0082	Design Registration	PRIOR to implementation	5.2
N-MAN-01913.11-10000	Pressure Boundary Program Manual	When implemented	5.2
N-LIST-00531-10003	Index to OPG Pressure Boundary Program Elements	When implemented	5.2
N-CORR-00531-22359	Authorized Inspection Agency for Pressure Boundary Inspection and Registration Services	PRIOR to implementation	5.2

Document #	Document Title	Notification Requirements	L.C.
N-CORR-00531-24236	OPG - Amendment to the Formal Agreement with the Authorized Inspection Agency for Pressure Boundary Inspection and Registration Services	PRIOR to implemented	5.2
N-PROG-RA-0006	Environmental Qualification	When implemented	5.3
	FITNESS FOR SERVICE		
N-PROG-MA-0004	Conduct of Maintenance	When implemented	6.1
N-PROG-MA-0017	Component and Equipment Surveillance	When implemented	6.1
N-PROG-MA-0019	Production Work Management	When implemented	6.1
N-PROG-MP-0008	Integrated Aging Management	When implemented	6.1
N-PROC-MA-0013	Planned Outage Management	When implemented	6.1
N-PROC-MA-0049	Forced Outage Management	When implemented	6.1
N-PROG-MA-0026	Equipment Reliability	When implemented	6.1
N-PROG-RA-0016	Risk and Reliability Program	When implemented	6.1 4.1
N-STD-RA-0033	Reliability Monitoring and Reporting of Systems Important to Safety	When implemented	6.1
NK38-LIST-06937-10001	List of Safety Related Systems and Functions	PRIOR to implementation	6.1
N-PROG-MA-0025	Major Components	When implemented	6.1
N-PLAN-01060-10001	Feeders Life Cycle Management Plan	PRIOR to implementation**	6.1
N-PLAN-01060-10007	Feeders Life Cycle Management Plan: Technical Basis Document	When implemented	6.1
N-PROC-MA-0044	Fuel Channel Life Cycle Management	When implemented	6.1
NK38-PIP-33160-10001	Darlington Nuclear Unit 1 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	PRIOR to implementation	6.1

Document #	Document Title	Notification Requirements	L.C.
NK38-PIP-33160-10002	Darlington Nuclear Unit 2 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	PRIOR to implementation	6.1
NK38-PIP-33160-10003	Darlington Nuclear Unit 3 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	PRIOR to implementation	6.1
NK38-PIP-33160-10004	Darlington Nuclear Unit 4 Fuel Channel Feeder Pipes Periodic Inspection Program Plan	PRIOR to implementation	6.1
COG-JP-4107-V06-R03	Fitness-for-Service Guidelines (FFSG) for Feeders in CANDU Reactors	PRIOR to implementation	6.1
N-PLAN-33110-10009	Steam Generators Life Cycle Management Plan	PRIOR to implementation*	6.1
NK38-PLAN-33110-00001	Darlington Units 1-4 Steam Generator Life Cycle Management Plan	PRIOR to implementation*	6.1
COG-07-4089–R02	Fitness-for-Service Guidelines for Steam Generator and Preheater Tubes	PRIOR to implementation	6.1
N-PLAN-01060-10002	Fuel Channels Life Cycle Management Plan	PRIOR to implementation*	6.1
NK38-PIP-31100-10001	Darlington Nuclear 1-4, Unit 1 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	PRIOR to implementation	6.1
NK38-PIP-31100-10002	Darlington Nuclear 1-4, Unit 2 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	PRIOR to implementation	6.1
NK38-PIP-31100-10003	Darlington Nuclear 1-4, Unit 3 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	PRIOR to implementation	6.1
NK38-PIP-31100-10004	Darlington Nuclear 1-4, Unit 4 Fuel Channel Pressure Tubes Periodic Inspection Program Plan	PRIOR to implementation	6.1

Document #	Document Title	Notification Requirements	L.C.
N-PLAN-01060-10003	Reactor Components and Structures Life Cycle Management Plan	PRIOR to implementation	6.1
NK38-PLAN-31160-10000	Long Term Darlington Life Management Plan for Inconel X-750 Annulus Spacers	PRIOR to implementation	6.1
N-REP-31100-10061	Compliance Plan for Long-Term Use of CSA N285.8 For In-Service Evaluation of Zirconium Alloy Pressure Tubes	PRIOR to implementation	6.1
N-REP-31100-10041	Acceptance Criteria and Evaluation Procedures for Material Surveillance Pressure Tube	PRIOR to implementation	6.1
NK38-PIP-03641.2-10001	Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 1	PRIOR to implementation	6.1
NK38-PIP-03641.2-10002	Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 2	PRIOR to implementation	6.1
NK38-PIP-03641.2-10003	Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 3	PRIOR to implementation	6.1
NK38-PIP-03641.2-10004	Darlington Nuclear Generating Station Periodic Inspection Plan for Unit 4	PRIOR to implementation	6.1
NK38-PIP-03642.2-10001	Darlington Nuclear Generating Station - Periodic Inspection Program for Unit 0 and Units 1 to 4 Containment Components	PRIOR to implementation	6.1
NK38-PIP-03643.2-10002	Darlington Nuclear - Unit 0 Containment Periodic Inspection Program	PRIOR to implementation	6.1
N-PLAN-01060-10004	Aging Management Plan for Concrete Containment Structures and Safety Related Structures	PRIOR to implementation	6.1
NK38-PIP-03643.2-10001	Darlington Nuclear – Reactor Building Periodic Inspection Program	PRIOR to implementation	6.1

Document #	Document Title	Notification Requirements	L.C.
NK38-PIP-03643.2-10003	Darlington Nuclear - Vacuum Building Periodic Inspection Program	PRIOR to implementation	6.1
NK38-TS-03643-10001	Inspection of Post Tensioning Tendons on DNGS Vacuum Building	PRIOR to implementation	6.1
N-PROC-MA-0066	Administrative Requirements for In-Service Inspection and Testing for Concrete Containment Structures	PRIOR to implementation	6.1
I-STD-AS-0003	Non-Destructive Examination	When implemented	6.1
NK38-REP-34200-10066	Darlington NGS Main Containment Structure In-Service Leakage Rate Test Requirements In Accordance With CSA N287.7-08	PRIOR to implementation	6.1
NK38-REP-26100-10005	Darlington NGS Vacuum Structure In-Service Leakage Rate Test Requirements In Accordance With CSA N287.7-08	PRIOR to implementation	6.1
RADIATION PROTECTION			
N-PROG-RA-0013	Radiation Protection	PRIOR to implementation	7.1 15.5
N-STD-RA-0018	Controlling Exposure As Low As Reasonably Achievable	When implemented	7.1
N-STD-RA-0044	Occupational Radiation Protection Action Levels for Power Reactor Operating Licences	PRIOR to implementation	7.1
N-PROC-RA-0019	Dose Limits and Exposure Control	PRIOR to implementation	7.1
N-PROC-RA-0027	Radioactive Work Planning, Execution and Close Out	When implemented	7.1
N-MAN-03416-10000	Radiation Dosimetry Program – General Requirements	When implemented	7.1
N-MAN-03416.1-10000	Radiation Dosimetry Program – External Dosimetry	When implemented	7.1
N-MAN-03416.2-10000	Radiation Dosimetry Program – Internal Dosimetry	When implemented	7.1
OPG-PROC-0132	Respiratory Protection	When implemented	7.1

Document #	Document Title	Notification Requirements	L.C.
CONVENTIONAL HEALTH AND SAFETY			
N-PROG-MA-0015	Work Protection	When implemented	8.1
OPG-POL-0001	Employee Health and Safety Policy	When implemented	8.1
OPG-PROG-0005	Environment Health and Safety Managed Systems	When implemented	8.1
OPG-PROC-0132	Respiratory Protection	When implemented	8.1
N-PROG-RA-0012	Fire Protection	PRIOR to implementation	8.1 10.2
NK-38-LIST-78000-10001	Application of CSA N293 to Structures, System and Components for Darlington Nuclear	PRIOR to implementation	8.1
ENVIRONMENTAL PROTECTION			
OPG-POL-0021	Environmental Policy	When implemented	9.1
OPG-PROG-0005	Environment Health and Safety Managed Systems	When implemented	9.1 11.1
NK38-MAN-03480-10001	Environment Manual	When implemented	9.1
N-PROC-OP-0025	Environmental Monitoring Programs	When implemented	9.1
OPG-PROC-0126	Hazardous Material Management	When implemented	9.1
N-STD-OP-0031	Monitoring of Nuclear and Hazardous Substances in Effluents	When implemented	9.1
N-PROC-OP-0044	Contaminated Lands Management	When implemented	9.1
NK38-REP-03482-10001	Derived Release Limits for Darlington Nuclear Generating Station	PRIOR to implementation	9.1
N-PROC-OP-0037	Environmental Approvals	When implemented	9.1
N-PROC-OP-0038	Abnormal Waterborne Tritium Emission Response	When implemented	9.1
NK38-MAN-03443-10002	Darlington Environmental Monitoring Program	When implemented	9.1
N-STD-OP-0046	Groundwater Protection and Monitoring Program	PRIOR to implementation	9.1

Document #	Document Title	Notification Requirements	L.C.
DREP-07701-00001	2020 Environmental Risk Assessment for the Darlington Nuclear Site	When implemented	9.1
D-REP-07701-00002	2024 Environmental Risk Assessment Addendum for the Darlington Nuclear Site	When implemented	9.1
EMERGENCY MANAGEMENT AND FIRE PROTECTION			
N-PROG-RA-0001	Consolidated Nuclear Emergency Plan	PRIOR to implementation	10.1
N-PROC-RA-0045	OPG Nuclear Emergency Response Organization Drills and Exercises	When implemented	10.1
N-PROG-RA-0012	Fire Protection	PRIOR to implementation	10.2 8.1
NK38-REP-09701-10338	Fire Hazard Assessment of the DNGS Retube Waste Processing Building (RWPB)	PRIOR to implementation	10.2 11.1
WASTE MANAGEMENT			
OPG-PROG-0005	Environment Health and Safety Managed Systems	When implemented	11.1 9.1
OPG-STD-0156	Management of Waste and Other Environmentally Regulated Materials	When implemented	11.1
N-PROC-RA-0017	Segregation and Handling of Radioactive Waste	When implemented	11.1
NK38-PLAN-09701-10293	Operations & Maintenance Plan - Retube Waste Processing Building	PRIOR to implementation	11.1
NK38-REP-09701-10344	Retube Waste Processing Building Safety Analysis Summary Report	PRIOR to implementation	11.1 4.1
NK38-REP-09701-10326	Darlington Retube Waste Processing Building - Safety Assessment	PRIOR to implementation	11.1 4.1
NK38-CORR-09701-0597849	RWPB Worker Dose During Normal Operations and Under Accident Conditions	PRIOR to implementation	11.1 4.1
NK38-REP-09701-10338	Fire Hazard Assessment of the DNGS Retube Waste Processing Building (RWPB)	PRIOR to implementation	11.1 10.2

Document #	Document Title	Notification Requirements	L.C.
W-PROG-WM-0003	Decommissioning Program	PRIOR to implementation	11.2
NK38-PLAN-00960-10001	Darlington Nuclear Site Preliminary Decommissioning Plan	PRIOR to implementation	11.2
SECURITY			
8300-REP-61400-10003	Darlington Nuclear Generating Station Security Report	PRIOR to implementation	12.1
8300-PLAN-61400-10012	Darlington Nuclear Security Tactical Plan	PRIOR to implementation	12.1
N-PROG-RA-0011	Nuclear Security	PRIOR to implementation	12.1
NK38-REP-08160.3-00001	Darlington Nuclear Generating Station and Nuclear Sustainability Services - Darlington - Harmonized Threat Vulnerability and Risk Assessment	When implemented	12.1
N-PROC-RA-0135	Cyber Security	When implemented	12.1
N-STI-08161-10017	Cyber Essential Asset Identification and Classification	When implemented	12.1
N-INS-08161-10011	Cyber Security Controls for Cyber Essential Assets	When implemented	12.1
OPG-PROG-0042	Cyber Security	When implemented	12.1
SAFEGUARDS			
N-PROG-RA-0015	Safeguards and Nuclear Material Accountancy	PRIOR to implementation	13.1
N-STD-RA-0024	Safeguards and Nuclear Material Accountancy Implementation	PRIOR to implementation	13.1
N-PROC-RA-0136	OPG Safeguards and Nuclear Material Accountancy Requirements	PRIOR to implemented	13.1
PACKAGING AND TRANSPORT			
W-PROG-WM-0002	Radioactive Material Transportation	When implemented	14.1 15.5
N-STD-RA-0036	Radioactive Materials Transportation Emergency Response Plan	When implemented	14.1

Document #	Document Title	Notification Requirements	L.C.
SITE SPECIFIC			
NK38-OPP-03600	Operating Policies and Principles	PRIOR to implementation	15.1 3.1 3.2
D-INS-39000-10003	Tritium Removal Facility Planned Outage Management	When implemented	15.1
N-PROG-AS-0008	Heavy Water Management	When implemented	15.1
NK38-NR-PLAN-09701-10001, Sheet: 0003	Darlington Refurbishment Return to Service Program Management Plan	When implemented	15.2
N-PROC-MP-0090	Engineering Change Control Process	PRIOR to implementation	15.2 5.1
N-PROC-MA-0109	Periodic Safety Review	When implemented	15.3
NK38-INS-09701-10006	Nuclear Refurbishment Unit Readiness for Service Process	PRIOR to implementation	15.4
W-PROG-WM-0002	Radioactive Material Transportation	When implemented	15.5 14.1
N-PROG-RA-0013	Radiation Protection	PRIOR to implementation	15.5 7.1
NK38-OM-30550	Target Delivery System (TDS)	When implemented	15.6
NK38-MMP-30550-13	Target Delivery System Transport Package Flasking	When implemented	15.6
N-REP-03500-0839983	Integrated Nuclear Safety and Operational Assessment of the Target Delivery System in Darlington	When implemented	15.6

**Prior notification is only required when changes to the document result in changes to the PIP that has received regulatory acceptance.*

APPENDIX E – LIST OF DOCUMENTS USED AS GUIDANCE OR CRITERIA

E.1 – All Canadian Standards Association (CSA) documents referenced in the LCH in Recommendations and Guidance

Document #	Document Title	L.C.
CSA N290.11	Requirements for heat sink removal capability during outage of nuclear power plants	3.1
CSA N290.16	Requirements for beyond design basis accidents	3.1
CSA N290.18	Periodic safety review for nuclear power plants	3.4
CSA N290.17	Probabilistic safety assessment for nuclear power plants	4.1
CSA N287.1	General requirements for concrete containment structures for CANDU nuclear power plants	5.1
CSA N287.2	Material requirements for concrete containment structures for CANDU nuclear power plants	5.1
CSA N287.3	Design requirements for concrete containment structures for CANDU nuclear power plants	5.1
CSA N287.4	Construction, fabrication, and installation requirements for concrete containment structures for CANDU nuclear power plants	5.1
CSA N287.5	Examination and testing requirements for concrete containment structures for CANDU nuclear power plants	5.1
CSA N287.6	Re-operational proof and leakage rate testing requirements for concrete containment structures for CANDU nuclear power plants	5.1
CSA N289.2	Ground motion determination for seismic qualification of CANDU nuclear power plants	5.1 5.2 5.3
CSA N289.3	Design procedures for seismic qualification of CANDU nuclear power plants	5.1 5.2 5.3
CSA N289.4	Testing procedures for seismic qualification of CANDU nuclear power plants	5.1 5.2 5.3
CSA N289.5	Seismic instrumentation requirements for CANDU nuclear power plants	5.1 5.2 5.3
CSA N290.1	Requirements for the shutdown systems of nuclear power plants	5.1
CSA N290.2	General requirements for emergency core cooling systems for nuclear power plants	5.1
CSA N290.3	Requirements for containment system of nuclear power plants	5.1
CSA N290.4	Requirements for reactor control systems of nuclear power plants	5.1
CSA N290.5	Requirements for electrical power and instrument air systems of CANDU nuclear power plants	5.1
CSA N290.6	Requirements for monitoring and display of nuclear power plant safety functions in the event of an accident	5.1

Document #	Document Title	L.C.
CSA N286.10	Configuration management for high energy reactor facilities	5.1
CSA N285.6 Series	General requirements for pressure-retaining systems and components in CANDU nuclear power plants/material standards for reactor components for CANDU nuclear power plants	5.2
CSA N290.9	Reliability and maintenance programs for nuclear power plants	6.1
CSA N288.2	Guidelines for Calculating the Radiological Consequences to the Public of a Release of Airborne Radioactive Material for Nuclear Reactor Accidents	9.1
CSA B51	Boiler, Pressure Vessel and Piping	5.2

E.2 – Other Codes or Standards referenced in the LCH

Document #	Document Title	L.C.	e-Doc #
COG-09-9030-R03	Principles & Guidelines for Deterministic Safety Analysis, CANDU Owners Group, Safety Analysis Improvement Task Team	3.2 4.1	N/A
COG-12-2049	Fuel and Pressure Tube Fitness-For-Service Criteria for LOF, SBLOCA and Slow LORC	3.2	N/A
IAEA	Specific Safety Guide No. SSG-25 - Periodic Safety Review for Nuclear Power Plants	3.4	N/A
COG-11-9023-R00	Guidelines for Application of the Limit of Operating Envelope Methodology to Deterministic Safety Analysis	4.1	3966049
COG-06-9012-R01	Guidelines for Application of the Best Estimate Analysis and Uncertainty (BEAU) Methodology to Licensing Analysis	4.1	3367467
COG-08-2078-R00	Principles and Guidelines for NOP/ROP Trip Setpoint Analysis for CANDU Reactors	4.1	4251741
UFC 3-340-02	Structures to Resist the Effects of Accidental Explosions	5.1	N/A
ASME B31.1	Power Piping	5.2	N/A
ASME B31.3	Process Piping Code	5.2	N/A
ASME B31.5	Refrigeration Piping and Heat Transfer Component Code	5.2	N/A
ASME	Boiler and Pressure Vessel Code	5.2 6.1	N/A
NFPA 24	Standard for the Installation of Private Fire Service Mains and Their Appurtenances	5.2	N/A
NEI 00-01	Guidance for Post Fire Safe Shutdown Circuit Analysis	10.2	N/A
IAEA	Nuclear Security Series No. 4, Technical Guidance: Engineering Safety Aspects of the Protection of Nuclear Power Plants Against Sabotage	12.1	IAEA Website
IAEA	Nuclear Security Series No. 13, Recommendations: Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)	12.1	IAEA Website

Document #	Document Title	L.C.	e-Doc #
IAEA	Nuclear Security Series No. 17, Technical Guidance: Computer Security at Nuclear Facilities	12.1	IAEA Website

E.3 – Other CNSC documents referenced in the LCH

Document #	Document Title	L.C.	e-Doc #
REGDOC-3.5.3	Regulatory Fundamentals, version 3 (2023)	G.1	CNSC Website
REGDOC-2.2.1	Human Factors	2.1	CNSC Website
REGDOC-2.5.1	General Design Considerations: Human Factors	2.1 2.2 5.1	CNSC Website
REGDOC-2.2.5	Minimum Shift Compliment	2.2	CNSC Website
CNSC-EG1, Rev.0	Requirements and Guidelines for Written and Oral Certification Examinations for Shift Personnel at Nuclear Power Plants	2.3	3402702
CNSC-EG2, Rev.0	Requirements and Guidelines for Simulator-Based Certification Examinations for Shift Personnel at Nuclear Power Plants	2.3	3402705
N/A	Requirements for the Requalification Testing of Certified Shift Personnel at Nuclear Power Plants, Revision 2	2.3	3436327
REGDOC-2.4.5	Nuclear Fuel Safety	3.2	CNSC Website
RD-360	Life Extension of Nuclear Power Plants	3.4 15.4 B.2	CNSC Website
REGDOC-1.1.3	Licence Application Guide: Licence to Operate a Nuclear Power Plant	3.4	CNSC Website
REGDOC-2.5.2	Design of Reactor Facilities: Nuclear Power Plants	5.1	CNSC Website
REGDOC-2.7.1	Radiation Protection	7.1	CNSC Website
REGDOC-2.8.1	Conventional Health and Safety	8.1	CNSC Website
P-223	Protection of the Environment	9.1	CNSC Website
G-274	Security Programs for Category I or II Nuclear Material or Certain Nuclear Facilities	12.1	CNSC Website
G-208	Transportation Security Plans for Category I, II or III Nuclear Material	12.1	CNSC Website
REGDOC-2.3.1	Conduct of Licensed Activities: Construction and Commissioning Programs	15.2	CNSC Website
P-299	Regulatory Fundamentals	A.2	CNSC Website

Document #	Document Title	L.C.	e-Doc #
P-242	Considering Cost-benefit Information	A.2	CNSC Website
N/A	Risk Informed Approach for the CNSC Power Reactor Regulatory Program – Basis Document	A.2	3466324
RD-310	Safety Analysis for Nuclear Power Plants	B.2	CNSC Website
N/A	Select and Apply Enforcement Tools	B.2	3320246
S-294	Probabilistic Safety Assessment (PSA) for Nuclear Power Plants	B.2	CNSC Website
N/A	Risk-Informing CNSC Planning, Licensing, and Compliance Activities	B.2	N/A

APPENDIX F – APPROVALS PURSUANT TO A PROL LC GRANTED BY THE COMMISSION

L.C	Subject of the Approval	e-Doc #	Licensee's reference #	Effective Date	Expiry Date

APPENDIX G – CONSENTS PURSUANT TO A PROL LC

L.C	Subject of the Consent	e-Doc #	Licensee's reference #	Effective Date	Expiry Date

APPENDIX H – RESOLUTION OF INCONSISTENCIES

L.C.	Subject of Conflict or Inconsistency	e-Doc #	Licensee's reference #	Identifier	Approved Date