# Darlington New Nuclear Project
# Licence to Construct Application Plan

**NK054-PLAN-01210-00007-R001**

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**OPG Proprietary**

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## Revision Summary

| Revision Number | Date | Comments |
|---|---|---|
| R000 | 2021-06-08 | Initial issue. |
| R001 | 2022-05-31 | Plan revised to include more details on the scope and content of the Licence to Construct Application post technology selection. |

# 1.0 GENERAL

## 1.1 DNNP Background

Ontario Power Generation (OPG) is progressing the planning work for the Darlington New Nuclear Project (DNNP) with the objective to construct a new nuclear generating station adjacent to the existing Darlington Nuclear Generating Station (DNGS), at the Darlington Nuclear site. The Darlington Nuclear site is located along the north shore of Lake Ontario, in the Municipality of Clarington.

The lands on which the DNNP site is situated are within the shared traditional and treaty territory of the Chippewa and Mississauga Anishnawbeg, collectively known as the Williams Treaties First Nations.

An Environmental Assessment (EA) for the DNNP was completed in 2009 using a Plant Parameters Envelope (PPE) approach that encompassed four reactor technologies that OPG was considering at that time. The results of the EA are documented in the Environmental Impact Statement (EIS) Report [R-1] and were accepted by the Joint Review Panel in 2012. The EIS concludes that the DNNP, taking into account the mitigation measures identified, will not result in any significant adverse environmental effects. OPG committed to review the EIS and PPE following the selection of the reactor technology.

OPG currently holds Nuclear Power Reactor Site Preparation Licence (PRSL) 18.00/2031 for DNNP [R-2].

On December 2021, OPG announced the grid-scale Small Modular Reactor (SMR) BWRX-300, being developed by General Electric Hitachi hereafter referred to as GEH, as the selected technology for DNNP. OPG will work with GEH to deploy the BWRX-300 at the DNNP site.

OPG intends to submit the Licence to Construct (LTC) application for the first SMR unit to the Canadian Nuclear Safety Commission (CNSC) by the end of 2022.

## 1.2 DNNP Scope and Major Milestones

The current project scope for DNNP is to construct a BWRX-300 SMR with an output of approximately 300 MWe, and the required infrastructure.

For LTC application planning purposes the projected timeline for the DNNP major milestones is provided below.

| DNNP Major Milestones | Timeline |
|---|---|
| Submission of LTC Application | Q4 2022 |
| Submission of all LTC Application Supporting Packages (Package #1 to Package #6) | Q4 2022 – Q1 2023 |
| LTC Issued | Q4 2024 |
| Begin construction activities under LTC | Q1 2025 |

## 1.3 LTC Application Plan Purpose and Objective

The objective of this plan is to ensure sufficiency of the LTC application and its supporting submission documents for CNSC staff to review, assess and make a recommendation to the Commission to issue a construction licence.

This document is to provide details regarding OPGs approach to the preparation of the LTC application, following the selection of the reactor technology. This plan identifies the following:

1. LTC application scope and objectives;
2. LTC application activities;
3. LTC application supporting documents;
4. LTC application commitments; and
5. Planned timelines for the submission of the LTC application and its supporting documents.

### 1.4 CNSC Engagement Regarding LTC Application Purpose and Objective

The details regarding the OPG and CNSC engagement related to DNNP prior to and after LTC application submission are provided in the OPG-CNSC protocol for DNNP [R-3].

The purpose of the protocol is to:

- establish a communication process (formal and informal) between OPG and CNSC staff;
- provide a framework within which OPG will provide a LTC application and submissions;
- provide a framework within which CNSC staff will perform a technical assessment of the application and submissions to make a recommendation to the Commission on OPG's application for a LTC; and
- provide a framework for resolving any issues that may arise during the technical assessment process.

## 2.0 DNNP LTC APPLICATION SCOPE AND OBJECTIVES

The LTC application and its supporting packages will address the requirements of the regulatory document REGDOC-1.1.2 *Licence Application Guide: Guide to Construct a Reactor Facility,* draft version 2 (November 2021), and meet the objectives specified in Appendix C of the above REGDOC.

The LTC application will cover the following scope of work:

1. Design, procurement and construction of one SMR unit (BWRX-300);

2. Design and construction of the required infrastructure (e.g. intake and discharge for the condenser cooling water, and switchyard) for the new nuclear facility. Where appropriate, specific elements of the required infrastructure may be designed and constructed to accommodate up to a total of four BWRX-300 units;

3. Testing and commissioning activities with no fuel in the reactor; and

4. Submission of information for consideration in planning for operation.

The scope of the LTC application will include a description of the radioactive waste management strategy.

## 3.0 LICENSING BASIS

The licensing basis sets the boundary conditions for a regulated activity, and establishes the basis for the CNSC's compliance program for that regulated activity. The concept of the licensing basis is explained in REGDOC-3.5.3, *Regulatory Fundamentals*.

The licensing basis include the following:

1. The regulatory requirements set out in the applicable laws and regulations.

   Appendix A of REGDOC-1.1.2 draft version 2 will be used as guidance to identify the applicable legislation and the clauses for the DNNP LTC licensed activities and this information will be provided in the LTC application.

2. The conditions, safety and control measures that will be described in the construction licence, and the documents directly referenced in that licence.

   The documents directly referenced in the licence would include programmatic licensee documents.

3. The safety and control measures described in the LTC application and the documents needed to support the application.

   The documents needed to support the LTC application will be prepared and submitted to the CNSC to address REGDOC-1.1.2 draft version 2 requirements and several construction phase regulatory commitments.

   These documents will demonstrate that OPG is qualified to carry out the licensed activities, and that appropriate provisions are in place to protect workers and public health and safety, to protect the environment, and to maintain national security and measures required to implement international obligations to which Canada has agreed.

The supporting documents for the LTC application not directly relevant to safety and control measures for the nuclear facility or activities authorized by the licence will be excluded from the licensing basis.

## 4.0 LTC APPLICATION DEVELOPMENT

The LTC application development follows the process as shown in Figure 1. The process will culminate in the submission of the DNNP LTC application and the supporting packages to the CNSC.

### 4.1 Preliminary Activities for the LTC Application Development

The activities outlined below are to be conducted in advance of the LTC application submission. These activities and their results will be captured in a set of documents, which will be submitted to the CNSC in advance of the LTC application. These documents are summarised in Table 1.

#### 4.1.1 Indigenous Engagement

In October 2021, OPG prepared the Darlington New Nuclear Project (DNNP) Indigenous Engagement Plan, NK054-PLAN-01210-00028, and submitted it to the CNSC [R-4] for information, in accordance with REGDOC-3.2.2, *Indigenous Engagement Plan*. This plan covers the period from 2021 to 2024. It documents the engagement scope and activities on the DNNP that OPG has and will conduct throughout the site preparation and LTC phases of the project with Indigenous Nations and Communities.

#### 4.1.2 Revision of the LTC Application Plan

This document is an update to the revision R00 of the LTC application plan that was concurred by the CNSC in October 2021 [R-5].

The revision R01 of the LTC application plan (this plan) is to be submitted to the CNSC staff for concurrence in advance of the LTC application submission.

#### 4.1.3 Identification of the Applicable REGDOCs, Codes and Standards

OPG has identified the CNSC Regulatory Documents (REGDOCs), codes and standards, applicable for the DNNP design and construction activities. For this activity, OPG reviewed REGDOCs, codes and standards issued prior to December 31, 2021. The applicable REGDOCs, codes and standards with the selection methodology will be provided in a report to be submitted to CNSC staff for concurrence in advance of the LTC application submission.

OPG intends to use the identified versions and code effective dates of the applicable REGDOCs, codes, standards for the DNNP design and construction phase. Where applicable, graded or alternate approach will be used.

### 4.1.4 Revision of the Commitments Report

The DNNP Commitments Report [R-6] is a living document and OPG plans to update the report on multiple occasions during the LTC application process. Any changes to the DNNP Commitments Report will be submitted to the CNSC for review and acceptance.

OPG will prepare the revision R08 of the DNNP Commitment Report [R-6], to update the REGDOCs, codes and standards, and submission timeline of certain construction phase commitments to enable their completion in a phased approach and their alignment with the planned design and construction activities.

The revision R08 of the DNNP Commitments Report will be submitted to the CNSC for review and acceptance in advance of the LTC application submission.

### 4.1.5 Environmental Impact Statement Comprehensive Review

Following the selection of the reactor technology for the DNNP site, OPG committed to demonstrate that the deployment of BWRX-300 at DNNP is consistent with the DNNP EA.

OPG is conducting a comprehensive review of the EIS for the BWRX-300. The review will fulfill the commitment D-P-12.1(a), as specified in the DNNP Commitments Report [R-6].The results of this review will be submitted to the CNSC prior to LTC application submission

### 4.1.6 Plant Parameters Envelope Review

The Plant Parameters Envelope (PPE) represents the bounding values of the parameters for the technologies being considered for EA purposes. The PPE was an input to determine the predicted effects for the purposes of the EA without a technology selection.

A report on the BWRX-300 design parameters against the PPE values to fulfill the related commitments under D-C-3.1 of the DNNP Commitments Report [R-6] will be documented and submitted to the CNSC prior to the LTC application submission.

### 4.1.7 Completion of IAEA Safeguards Preliminary Design Information Questionnaire Form

OPG will complete the preliminary Design Information Questionnaire (DIQ) for BWRX-300 design. OPG will engage the CNSC staff on the DIQ and will submit to the CNSC the completed preliminary DIQ forms prior to LTC application submission to support early IAEA engagement, in accordance with REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy*.

### 4.1.8 Identification and Development of the Methodologies for the LTC Application Supporting Documents

Some of the LTC application supporting documents will require their methodologies to be submitted to the CNSC prior to the LTC application. OPG will engage the CNSC in early discussions with regards to these methodologies.

OPG intends to submit the following methodology reports to the CNSC staff for concurrence in advance of the LTC application submission:

- Probabilistic Safety Assessment Methodology
- Hazard Analysis Methodology

OPG may engage the CNSC to discuss other methodologies on a case by case basis.

### 4.1.9 Identification of the LTC Application Supporting Documents

OPG has identified the supporting documents for the LTC application using the guidance provided in REGDOC-1.1.2, draft version 2 and its associated regulatory documents.

The supporting documents to be provided to the CNSC as part of the LTC application are summarized in Table 2 and their overview is provided in Section 5 of this plan.

Additionally, OPG has considered the DNNP Commitments Report [R-6] to identify any additional documents for the LTC application.

The commitments to be addressed as part of the LTC application are provided in Table 3. An overview of the documents to address these commitments is provided in Section 6 of this plan.

## 4.2 Development of the LTC Application

The development of the LTC application will follow the process outlined below:

1. Identification of the relevant legislation and regulatory requirements;
2. Planning of the LTC application content and format;
3. Preparation of the LTC application sections;
4. Assembly of the LTC application and its supporting packages; and
5. Review the LTC application and its supporting packages.

### 4.2.1 Relevant Legislation

OPG will demonstrate that it meets the requirements of the Nuclear Safety and Control Act (NSCA) and the associated regulations including Class I Nuclear Facilities Regulations. Appendix A of REGDOC-1.1.2 draft version 2 will be used as guidance to

identify the applicable legislation and clauses for the DNNP LTC licensed activities and this information will be provided in the LTC application.

### 4.2.2 REGDOC-1.1.2 Requirements and Guidance

REGDOC-1.1.2 draft version 2 is the licence application guide that identifies the information to be provided in support of an application for a licence to construct a reactor facility. OPG will use this document as guidance in the preparation of LTC application and submission to the CNSC to obtain a LTC for the DNNP site. OPG will address the requirements and guidance in this regulatory document using a graded approach.

### 4.2.3 LTC Application Content and Format

To facilitate the CNSC's review, the application will be organized according to the CNSC's 14 Safety and Control Area (SCA) framework and other regulatory matters. This is also consistent with the format of REGDOC-1.1.2 draft version 2.

OPG will review and consider REGDOC-1.1.2 draft version 2 guidance. The LTC application will summarize how OPG meets the requirements of REGDOC-1.1.2 draft version 2 and cross-reference other supporting documents for further details. Where appropriate, a graded approach or alternative approach will be used and will be identified with justification.

## 4.3 Development of the Supporting Documents for the LTC Application and Oversight

The LTC application supporting documentation will be developed using the guidance provided in the REGDOC-1.1.2 draft version 2 and its associated documents.

Some of the LTC application supporting documentation may refer to Licensing Topical Reports that have been previously submitted to the U.S. Nuclear Regulatory Commission by GEH.

OPG will have the necessary oversight in place to ensure quality for the supporting documents prepared by entities external to OPG under their quality management system, particularly for the design documents, before their acceptance.

Strategic oversight of the design activities is critical for OPG, to ensure quality in the design process, and the preparation of the supporting design documents, while ensuring experience and knowledge is built into design and programs. Engineering oversight follows a graded approach such that the degree of oversight is commensurate with the risk and complexity of the Structures, Systems and Components; safety significant items receive closer and more intrusive oversight.

For effective oversight, CSA N286-12 highlights that licensee should have the capability to understand the nuclear safety significance of any purchased expertise or equipment, and technically review the output before, during, and after implementation. This is known as the intelligent customer**.** OPG enacts the role of the intelligent customer through its nuclear management system, which complies with CSA N286-12.

## 4.4 Implementation of OPG Management System

The OPG Nuclear Management System is being utilized for the DNNP. This Management System is CSA N286-12 compliant and is based on decades of operational and project experience. Existing programs were reviewed to identify the specific programs applicable to the construction phase of the DNNP.

Analysis of OPG programs and implementing documents is in progress to ensure the needs of the construction phase of the DNNP are met. This activity includes the addition of DNNP specific content (e.g. technology specific information) and other necessary changes.

The next stage will focus on implementation of the actions that resulted from the analysis of the OPG programs. OPG will leverage program owners' expertise to prioritize and implement changes using a graded approach. In order to support implementation of SMR specific information into the Management System, OPG will work closely with GEH to identify technology specific requirements and required changes. During this stage updates and/or new documents, where necessary, will be developed to align OPG governance with needs of the DNNP and requirements of the SMR technology.

## 4.5 Tracking and Completion of New Regulatory Actions and Commitments Regarding LTC Application

Tracking and completion of any LTC related commitments will be done via the DNNP Commitments Report [R-6].

If any new corrective actions or mitigation measures are identified, they will be reviewed and if appropriate they will be added as new commitments or regulatory actions. The CNSC will be notified of any changes to the DNNP Commitments Report [R-6].

## 5.0 OVERVIEW OF THE SUPPORTING DOCUMENTS FOR LTC APPLICATION

A description of the supporting documents for the LTC application is provided in this section. All of these documents will be provided to the CNSC as part of the LTC application, with the exception of the Health and Safety Plan that has already been submitted to the CNSC

### 5.1 Program Management Plan

The DNNP Program Management Plan, NK054-PLAN-01210-00008, describes the overall program required to design, construct, and bring the SMR BWRX-300 online. This document may be revised for each phase of DNNP. The DNNP Program Management Plan, NK054-PLAN-01210-00008, will be updated and submitted in support of the LTC application.

### 5.2 Management System Report

The Management System Report will outline the programs of the OPG Management System that are applicable to the LTC phase along with the selection methodology. Also this report will provide details and status of changes to the applicable programs and associated governing documents of the OPG Management System required to support the DNNP construction activities.

### 5.3 Project Level 1 and Level 2 Schedule

The overall project milestones for the construction phase will be identified and captured in the project schedule, which may be subject to change. The OPG schedule will be integrated with the GEH and other contractors schedules to ensure alignment. A copy of current Level 1 and Level 2 schedule will be provided to the CNSC.

### 5.4 Training Plan

OPG will prepare a training plan for the construction phase which will include all the required training regarding all SCAs. This plan will include the simulator strategy and the certification training requirements for the new nuclear facility.

### 5.5 Indigenous Nations and Communities Engagement Report

OPG maintains Indigenous engagement to:

- Keep Indigenous Nations and Communities proximate to our facilities informed of nuclear station operations, emerging projects and station environmental performance, and;

- Seek the input and perspectives of Indigenous Nations and Communities representatives about OPG's ongoing nuclear operations and projects, and address and resolve concerns raised, as applicable.

OPG will continue to engage in these activities on an ongoing basis, and has undertaken specific Indigenous Nations and Communities engagement activities associated with the DNNP LTC application to ensure that the Indigenous Nations and Communities engagement requirements as outlined in REGDOC-1.1.2 draft version 2 are met.

An Indigenous Nations and Communities Engagement Report will be prepared and submitted to the CNSC to address the requirements in *REGDOC-3.2.2, Indigenous Engagement,* version 1.2.

## 5.6 Stakeholders Engagement Plan

OPG has a robust and on-going communications and engagement program with the public and stakeholders in communities where OPG facilities are located, as well as with the broader general public. OPG keeps the public and stakeholders informed of station operations, emerging projects and environmental performance. OPG will undertake specific public and stakeholder engagement activities associated with the DNNP.

OPG submitted the Stakeholder Engagement Plan for DNNP, NK054-PLAN-01210-00019, in support of the site preparation activities, which was accepted by the CNSC [R-7]. OPG will review and update this plan as required and the updated plan will be provided to the CNSC.

Note: the Public Information and Disclosure Program addresses the requirements of REGDOC-3.2.1, *Public Information and Disclosure* and the required information will be provided directly in the LTC application.

## 5.7 Preliminary Safety Analysis Report

As per CNSC Class I Nuclear Facilities Regulations, a Preliminary Safety Analysis Report (PSAR) demonstrating the adequacy of the nuclear facility design will be prepared in support of the LTC application.

The PSAR format will be developed in accordance with IAEA Specific Safety Guide, SSG-61 [R-8] and it will demonstrate compliance with the CNSC's REGDOC-1.1.2 draft version 2 and, REGDOC-2.5.2 version 1, regulatory documents.

The PSAR will be prepared using various input documents. OPG intends to submit to the CNSC the key input documents for the preparation of the PSAR as listed in Table 2 under Package #2 and #3. The rest of the input documents can be made available to the CNSC upon request.

The level of details provided by the PSAR will be commensurate with the level of design progress at the time of the PSAR preparation, in accordance with the Project Design Plan. The design phase prior to LTC application submission focuses on the specific

design definition for systems, structures, and components. This includes system design descriptions, design requirements, and system and component information (where appropriate), to support the conclusions of the PSAR.

### 5.8 Preliminary Safety Analysis Independent Peer Review Report

OPG will perform an independent review of the PSAR Chapter 15 Safety Analysis, using OPG qualified staff and industry experts as needed who are not involved in the development, review, or acceptance of GEH deliverables including the PSAR. The results of this review will be documented in the Preliminary Safety Analysis Independent Review Report.

### 5.9 Hazard Analysis Results Reports

The results of the internal and external hazard analysis, as required by REGDOC-1.1.2 draft version 2, will be documented in reports and a summary will be provided in PSAR Chapter 15.

### 5.10 Probabilistic Safety Assessment Reports

The analysis and results of the probabilistic safety assessment will be documented in reports and a summary will be provided in PSAR Chapter 15.

### 5.11 Site Evaluation Update Summary Report

*REGDOC-1.1.1*, *Site Evaluation and Site Preparation for New Reactor Facilities*, 2018, requires the results of site evaluation, in particular, the results of site baseline characterization to be reviewed for the duration of the lifecycle of the project.

OPG will perform a review of the site evaluation data as part of the LTC application. Any changes that may have occurred in the baseline data since the last update will be assessed to confirm the existing conclusions of the site evaluation remain valid. The results of this review will be submitted to the CNSC as part of the LTC application.

OPG will leverage, to the extent practical, the existing data, which has been updated as part of DNNP PRSL renewal application and the hazard screening work for the 2020 Probabilistic Safety Assessment update for the existing DNGS. Where applicable, this data will be used as an input for the development of the facility design and preliminary safety analysis supporting the LTC application.

Where it is required and practicable, the site baseline data update for the DNNP will be conducted in accordance with Appendix C and D of REGDOC-1.1.1, current codes, standards, and practices.

Additional site investigations are in progress for site baseline characterization, to collect more geotechnical and seismological data as per commitments D-P-9.3 and D-P-9.4. The collected data will be evaluated to validate the results of the site evaluation

performed for the site preparation licence, and to confirm that the inputs used for the design and preliminary safety analysis in support of the LTC application are bounding.

### 5.12 REGDOC-2.5.2 Compliance Matrix

A compliance review of the BWRX-300 design with REGDOC-2.5.2 version 1 will be conducted and the results will be documented in a report.

### 5.13 REGDOC-2.5.2 Justification for Alternative Approaches Report

The intended alternative approaches for the BWRX-300 design to address the requirements of REGDOC-2.5.2 version 1 will be summarized in a report along with the justification for the alternative approaches.

### 5.14 Project Design Plan

The project design plan will provide the design process and design documents.

### 5.15 Human Factors Engineering Program Plan

The design approach to address the human factors engineering is to be provided in the human factors engineering program plan, which will be provided to the CNSC as part of the LTC application.

### 5.16 Fuel Design Reports

The appropriate documentation regarding fuel design for BWRX-300 will be provided to the CNSC as part of the LTC application. This may refer to Licensing Topical Reports that have been previously submitted by GEH and accepted by the U.S. Nuclear Regulatory Commission.

### 5.17 Fuel Qualification Report

The overall plan for adopting a framework that will recognize GNF2 fuel as qualified for a BWRX-300 reactor within Canada will be documented in a fuel qualification report. Additionally, this report will summarize compliance with relevant CSNC regulatory requirements.

### 5.18 Preliminary Fire Safe Shutdown Analysis Report

The preliminary fire safe shutdown analyses report, as part of the LTC application, is a precursor to the version to be developed in compliance with CSA N293 S1 for LTO application submission. This document describes the analysis methodology and preliminary analysis to determine the impacts of a fire on the safe shutdown systems.

### 5.19 Preliminary Fire Hazards Assessment Report

A preliminary fire hazard assessment report will be provided to the CNSC as part of the LTC application. This document is a precursor to the version to be developed in compliance with CSA N293 S1 for LTO application submission. This document describes the fire hazard assessment methodology and preliminary fire hazard and specific safety analysis for the BWRX-300. This document reviews the applicable codes and standards, defines necessary acceptance criteria, and reviews the design and confirms suitability, commensurate with the level of design completion at time of PSAR. The document will continue to be developed and refined to address the fire hazard assessment in more detail, including a review of the fire hazards for each building that fall under the scope of CSA N293 S1, of the nuclear facility.

### 5.20 Fire Protection System Preliminary Code Compliance Review Report

The code compliance report of the fire protection preliminary design, as part of the LTC application, is a precursor to the final version to be developed in compliance with CSA N293 S1 for LTO submission. This document describes the review methodology and preliminary review of the applicable codes and standards to determine compliance with their requirements. The document will be developed further to address all aspects of fire protection and safety as the design of the facility is completed.

### 5.21 Independent Third Party Review of the Preliminary Fire Protection Design

The results of an independent third party review of the preliminary fire protection design will be documented in a report.

### 5.22 DNNP Site Security Plan

OPG prepared the DNNP Site Security Plan, NK054-PLAN-61400-00001, which was accepted by the CNSC under [R-9]. OPG will update this plan for the construction phase.

### 5.23 Threats Risk Assessment Report

OPG will perform a security threat risk assessment for DNNP construction phase. The results of this assessment will be documented in a report.

### 5.24 PSAR Security Annex

A Security Annex will be prepared for the PSAR to address REGDOC-1.1.2 draft version 2 requirements. Due to security classified information, the Security Annex will be separated from the PSAR and submitted to the CNSC as part of the LTC application support package #3. This document will address the physical security and cyber security aspects.

### 5.25 Environmental Monitoring and Environmental Assessment Follow-up Plan

OPG has developed the DNNP Environmental Monitoring and Environmental Assessment Follow-Up (EMEAF) Plan, NK054-PLAN-07730-00014, and submitted it to the CNSC under [R-10].

OPG conducted consultation on the DNNP EMEAF Plan with CNSC staff, various federal, provincial and municipality agencies, and with Indigenous Nations and Communities. The DNNP EMEAF Plan will be further refined to reflect the disposition of the comments received from these consultation sessions. OPG will submit the updated DNNP EMEAF Plan as part of the LTC application.

### 5.26 Radioactive Waste Management Plan

OPG will develop a Radioactive Waste Management Plan and provide it to the CNSC as part of the LTC application. OPG will provide the strategy for storage of used fuel, and low and intermediate level waste.

### 5.27 BWRX-300 Occupational Dose Assessment Report

An occupational radiological evaluation and safety assessment will be conducted in support of LTC application and the results will be documented in a report.

### 5.28 Health and Safety Plan

OPG has submitted to the CNSC the Health and Safety Plan NK054-PLAN-01210-00034 for DNNP [R-11] in support of site preparation. This plan includes the emergency response and fire protection. OPG will use this plan for the construction phase, to guide the contractors involved in the construction activities, and to prepare their health and safety plans.

### 5.29 Preliminary Decommissioning Plan (construction phase)

OPG will prepare a Preliminary Decommissioning Plan for the construction phase and will provide it to the CNSC as part of the LTC application.

### 5.30 Financial Guarantee (construction phase)

The value and the provisions in place for the financial guarantee for the construction phase will be provided to the CNSC as part of the LTC application.

### 5.31 Preliminary Decommissioning Plan (end of life)

OPG will prepare a Preliminary Decommissioning Plan for the end of life and will provide it to the CNSC as part of the LTC application.

## 5.32 Construction Management Plan

OPG will prepare a Construction Management Plan for DNNP. The Construction Management Plan will provide the details for the management of the activities under construction, and OPGs oversight of the construction vendors and construction activities. The Construction Management Plan will address the applicable requirements of REGDOC-1.1.2 draft version 2, and REGDOC-2.3.1 *Conduct of Licensed Activities: Construction and Commissioning Programs*.

## 5.33 Commissioning and Turn-over Program Management Plan

OPG will prepare and submit the Commissioning and Turn-over Program Management Plan to the CNSC as part of the LTC application. The Turnover and Commissioning Program Management Plan supports DNNP by describing the processes, procedures, and organization that will be used to manage the turnover and commissioning of the new nuclear facility. The plan identifies the major phases and hold points that will be the focus of this program.

The Plan will address the applicable requirements in REGDOC-1.1.2 draft version 2 and REGDOC-2.3.1 *Conduct of Licensed Activities: Construction and Commissioning Programs*.

## 6.0 LTC APPLICATION COMMITMENTS

The DNNP Commitments Report [R-6], specifies several regulatory commitments related to the construction phase of the DNNP. The activities and deliverables associated with these regulatory commitments need to be completed at various stages of the project with some part of the LTC application. There are also few commitments under the site preparation phase that are linked to the LTC application.

A summary of these commitments is provided below:

| Commitment # | Commitment Title | Deliverable Title | Submission Timeline |
|---|---|---|---|
| D-P-9.3 | Site Geotechnical Investigation | Geotechnical Investigation Results Report | Part of the LTC application |
| D-P-9.4 | Site Seismic Hazards Studies and Investigation | Seismic Investigation Results Report | Part of the LTC application |
| D-P-12.1(a) | EIS Review | EIS Comprehensive Review Report | Prior to LTC application |
| D-C-1.2 | EPC Condenser Cooling Water (CCW) Design | CCW Design | Prior to construction of CCW |
| D-C-2.1 | Non-Radiological Effluents Management Program / Design Documentation | Non-Radiological Effluents Management Program / Design Documentation | Prior to fuel out commissioning |
| D-C-3.1 | Preliminary Safety Analysis and Design | PPE Review Report | Prior to LTC application |
| | | Preliminary Safety Analysis Report | Part of the LTC application |
| D-C-4.1 | Radiological Effluents Management Program / Design Documentation | Radiological Effluents Management Program / Design Documentation | Prior to fuel in commissioning |
| D-C-5.1 | Radiological Air Emissions Management Program / Design Documentation | Radiological Air Emissions Management Program / Design Documentation | Prior to fuel in commissioning |
| D-C-5.2 | Non-Radiological Air Emissions Management | Non-Radiological Air Emissions Management Program | Prior to fuel out commissioning |

| | | | |
|---|---|---|---|
| | Program / Design Documentation | / Design Documentation | |
| D-C-6.1 | Radiological Environmental Monitoring Program | Radiological Environmental Monitoring Program | Prior to fuel in commissioning |
| D-C-7.1 | Contingency Plan for Flooding and Other Extreme Weather Hazards | Contingency Plan for Flooding and Other Extreme Weather Hazards | Prior to construction of the power block |
| D-C-8.1 | Meteorological Monitoring Station | Meteorological Monitoring Station Strategy | Prior to construction of meteorological monitoring station |
| D-C-9.1 | Radioactive Waste Management Plan | Radioactive Waste Management Plan | Part of the LTC application |

There are several common elements between the regulatory commitments part of the LTC application and the requirements under REGDOC-1.1.2 draft version 2. The submission of these commitments will be correlated with the submission of the supporting documents for the LTC application. For convenience, a summary of these commitments and their submission is provided in Table 3 of this plan.

An overview of the documents addressing commitments part of the LTC application, which are not covered in Section 5.0, is provided below.

## 6.1 Geotechnical Investigation Results Report

Additional site geotechnical investigations are conducted in a phased approach to accommodate the project needs in regards with geotechnical data. The results of the geotechnical investigations for the critical locations will be submitted to the CNSC as part of the LTC application per commitment D-P-9.3

## 6.2 Seismic Investigation Results Report

Additional site seismic investigations are in progress for site baseline characterization, to collect more seismological data per commitment D-P-9.4. The report documenting the results of this investigation will be submitted to the CNSC as part of the LTC application.

## 6.3 Condenser Cooling Water Conceptual Design

OPG has selected the once through cooling as the Condenser Cooling Water (CCW) option for DNNP. The design related commitments under D-C-1.2 will be addressed during the CCW design development and provided to CNSC prior to construction of

CCW. A description of the CCW conceptual design, systems and structures will be provided in the PSAR.

## 6.4 Exclusion Zone Calculation

As per commitment under D-C-3.1, a review of the exclusion zone needs to be conducted for the selected reactor technology. The exclusion zone calculation for BWRX-300 will be performed and provided as part of the PSAR.

## 7.0 SUBMISSION OF THE LTC APPLICATION AND ITS SUPPORTING DOCUMENTS

OPG as the applicant will have the overall responsibility for the submission of the LTC application and the supporting documents to the CNSC.

The DNNP LTC related documents that OPG will submit to the CNSC prior to LTC application submission are provided in Table 1.

The submission of the LTC application will initiate the construction licensing process for DNNP.

OPG will submit to the CNSC the supporting documents referenced in the LTC application in six submission packages per OPG-CNSC protocol [R-3].

| Package | Topic |
|---|---|
| 1 | Management Aspects |
| 2 | Design and Safety Analysis |
| 3 | Security |
| 4 | Environmental Monitoring & EA Follow-up |
| 5 | Core Control Processes & Operations Aspects |
| 6 | Construction & Commissioning Program |

Package 3 will include confidential and security protected documents and therefore will be designated as security-protected.

A significant number of these supporting documents will be provided to the CNSC at the same time with the LTC application submission in packages 1, 2 and 3. The remaining supporting documents will be provided to the CNSC within six months following LTC application submission in packages 4, 5 and 6. The submission timeline of the LTC application supporting documents and their mapping to the submission packages is provided in Table 2.

## 8.0 ACRONYMS

| | |
|---|---|
| CNSC | Canadian Nuclear Safety Commission |
| CSA | Canadian Standards Association |
| DIQ | Design Information Questionnaire |
| DNGS | Darlington Nuclear Generating Station |
| DNNP | Darlington New Nuclear Project |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| EMEAF | Environmental Monitoring and Environmental Assessment Follow-Up |
| ERA | Environmental Risk Assessment |
| GEH | General Electric Hitachi |
| IAEA | International Energy Atomic Agency |
| LTC | Licence to Construct |
| LTO | Licence to Operate |
| MWe | Mega-Watts Electric |
| NSCA | Nuclear Safety and Control Act |
| OPG | Ontario Power Generation |
| PRSL | Nuclear Power Reactor Site Preparation Licence |
| PSAR | Preliminary Safety Analysis Report |
| SCA | Safety and Control Areas |
| SMR | Small Modular Reactor |

## 9.0 REFERENCES

[R-1] NK054-REP-07730-00001, “Environmental Impact Statement New Nuclear-Darlington Environmental Assessment”, September 2009.

[R-2] PRSL-18.00/2031, “Nuclear Power Reactor Site Preparation Licence – OPG New Nuclear at Darlington Generating Station”, October 2021.

[R-3] “Protocol between Ontario Power Generation and Canadian Nuclear Safety Commission Staff for the Darlington New Nuclear Project: Pre-Construction and Construction Licence Application Activities”, December 2021.

[R-4] NK054-CORR-00531-10605, “DNNP Indigenous Engagement Plan for 2021 to 2024”, October 2021.

[R-5] NK054-CORR-00531-10614, “CNSC Comments Regarding OPG Darlington New Nuclear Project Licence to Construct Application Plan NK054-PLAN-01210-00007-R000, June 2021”, October 2021.

[R-6] NK054-REP-01210-00078 R007, “Darlington New Nuclear Project Commitments Report”, February 2021.

[R-7] NK054-CORR-00531-10661, “Canadian Nuclear Safety Commission (CNSC) Response to Darlington New Nuclear Project (DNNP) Stakeholders Engagement Plan and Request for Closure of Commitment D-P-17.1”, March 2022.

[R-8] IAEA Specific Safety Guide SSG-61, “Format and Content of the Safety Analysis Report for Nuclear Power Plants”, 2021.

[R-9] NK054-CORR-00531-10591, “DNNP – Request for CNSC Acceptance of Security Plan for Site Preparation and Closure of Commitment D-P-7.1”, September 2021.

[R-10] NK054-CORR-00531-10593, “DNNP - Submission of the Environment Monitoring and Environmental Assessment Follow-up (EMEAF) Plan for CNSC Review and Acceptance.”, August 2021.

[R-11] NK054-CORR-00531-10627, “DNNP: Submission of DNNP Health and Safety Plan and Request for Acceptance and Closure of Commitments D-P-2.1, D-P-5.2 and D-P-5.3”, November 2021.

## 10.0 FIGURES

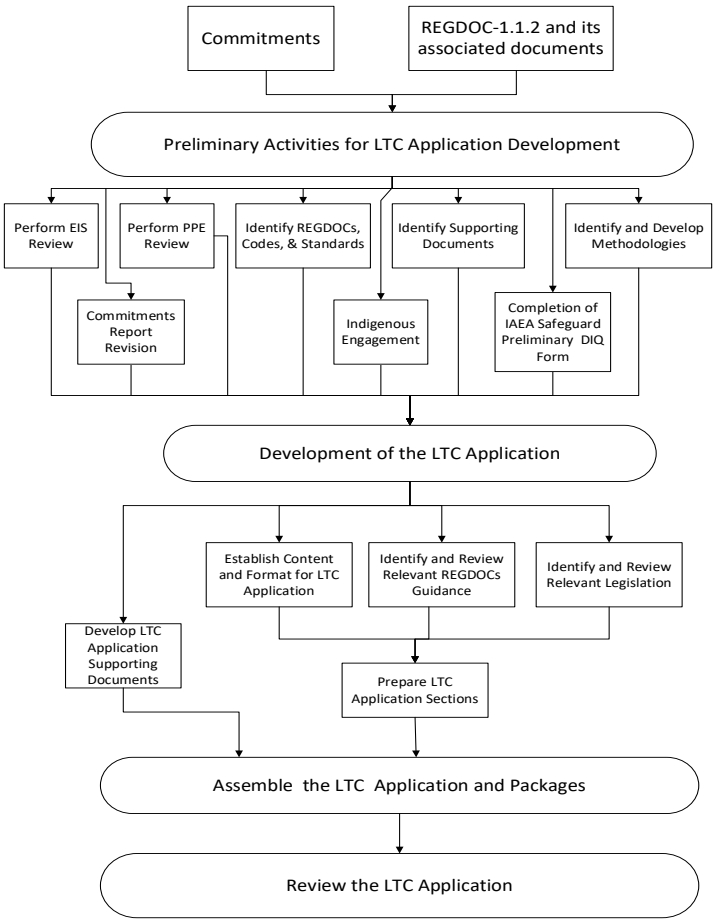


Figure 1: Process Diagram for DNNP LTC Application Development

## 11.0 TABLES

**Table 1: Documents to be Submitted to the CNSC Prior to LTC Application**

| Document Title | Document Purpose | Target Submission Date |
|---|---|---|
| Indigenous Engagement Plan | To provide the planned activities for Indigenous Nations and Communities engagement regarding DNNP | October 2021 (submitted) |
| LTC application Plan R01 (this document) | Provide an update to OPG approach for LTC application | Q2, 2022 |
| REGDOCs, Codes and Standards Report | Provide a list of the applicable REGDOCs, codes and standards for DNNP design and construction | Q2, 2022 |
| DNNP Commitments Report R08 | Provide an update for the construction phase commitments to align with applicable REGDOCs, codes and standards | Q2, 2022 |
| Environmental Impact Statement (EIS) Comprehensive Review Report | To address commitment D-P-12(a) | Q3, 2022 |
| Plant Parameter Envelope (PPE) Review Report | To address the related commitment under D-C-3.1 | Q3, 2022 |
| IAEA Safeguards Design Information Questionnaire Form | To meet the requirement of REGDOCs-2.13.1 and 1.1.2 draft version 2 | Q3, 2022 |
| Probabilistic Safety Assessment Methodology Report | To meet the requirement of REGDOC-2.4.2 | Q3, 2022 |
| Hazard Analysis Methodology Report | To demonstrate compliance with REGDOC-2.5.2 version1 | Q3, 2022 |

**Table 2: LTC Application Supporting Documents to be Submitted as Part of LTC Application**

| Document Title | Document Purpose | Submission Package | Target Submission Date |
|---|---|---|---|
| Program Management Plan | To provide the update on the existing PMP regarding the management aspects for specific areas of DNNP | Package #1 | Q4, 2022 |
| Management System Report | Provide a status update of the Management System planned activities for DNNP construction phase | Package #1 | Q4, 2022 |
| Training Plan | To provide OPG approach to training of DNNP staff for all SCAs as well as the training simulator strategy. | Package #1 | Q4, 2022 |
| Indigenous Nations and Communities Engagement Report | To provide an update on engagement with Indigenous Nations and Communities | Package #1 | Q4, 2022 |
| Stakeholders Engagement Plan | To provide un update of the planned activities to engage the public consultation regarding DNNP | Package #1 | Q4, 2022 |
| Preliminary Safety Analysis Report | To provide a summary of the preliminary safety analysis, design, and other aspects of the facility | Package #2 | Q4, 2022 |
| Site Evaluation Update Summary Report* | To provide the update for the site evaluation | Package #2 | Q4, 2022 |
| REGDOC-2.5.2 Compliance Review Matrix | To provide the results of the REGDOC-2.5.2 version 1 compliance review | Package #2 | Q4, 2022 |
| REGDOC-2.5.2 Justification for Alternative Approach Report | To provide the justification for the alternate approaches from the requirements of | Package #2 | Q4, 2022 |

| | | | |
|---|---|---|---|
| | REGDOC-2.5.2 version 1 | | |
| Project Design Plan | To document the required activities for design completion and their timeline | Package #2 | Q4, 2022 |
| Fuel Qualification Report* | To describe the plan for adopting a Canadian framework for fuel qualification | Package #2 | Q4, 2022 |
| Human Factor Engineering Program Plan | To document the design approach for human factor engineering | Package #2 | Q4, 2022 |
| Preliminary Fire Safe Shutdown Analysis Report | To provide the results of the preliminary fire safe shutdown analysis | Package #2 | Q4, 2022 |
| Preliminary Fire Hazards Assessment Report | To provide the results of the preliminary fire hazards assessment | Package #2 | Q4, 2022 |
| Fire Protection System Preliminary Code Compliance Review Report | To provide the results of the preliminary code compliance review for the fire protection design | Package #2 | Q4, 2022 |
| Independent Third Party Review Report of Preliminary Fire Protection Design | To provide the results of the third party review of the preliminary design for fire protection | Package #2 | Q4, 2022 |
| DNNP Site Security Plan | To provide the update for the existing site security plan | Package #3 | Q4, 2022 |
| Threats Risk Assessment Report | To provide the results of the security threats risk assessments for DNNP during the construction phase | Package #3 | Q4, 2022 |
| PSAR Security Annex* | PSAR Security Annex will address the REGDOC-1.1.2 and associated documents physical security and cyber security requirements. | Package #3 | Q4, 2022 |
| Probabilistic Safety Assessment Results Report* | To provide the results of the Probabilistic Safety Assessment | Package #3 | Q4, 2022 |

| | | | |
|---|---|---|---|
| Hazard Analysis Results Reports* | To provide the results of the hazard analysis (internal and external hazards) | Package #3 | Q4, 2022 |
| Fuel Design Reports* | Overview of the fuel design | Package #3 | Q4, 2022 |
| Project Level 1 and Level 2 Schedule | To provide DNNP milestones and activities with timelines | Package #3 | Q4, 2022 |
| Environmental Monitoring and Environmental Assessment Follow-up Plan | To provide the updated Environmental Monitoring and Environmental Assessment Follow-up Plan | Package #4 | Q1, 2023 |
| Radioactive Waste Management Plan | To provide radioactive waste management strategy for DNNP | Package #5 | Q1, 2023 |
| BWRX-300 Occupational Dose Assessment Report | To provide occupational dose assessment for BWRX-300 | Package #5 | Q1, 2023 |
| Preliminary Safety Analysis Independent Review Report | To provide the results of the independent review of the safety analysis (PSAR Chapter 15) | Package #5 | Q1, 2023 |
| Preliminary Decommissioning Plan (construction phase) | To provide the preliminary decommissioning plan for construction phase | Package #6 | Q1, 2023 |
| Financial Guarantee (construction phase) | To provide the provisions in place for the financial guarantee for the construction phase | Package #6 | Q1, 2023 |
| Preliminary Decommissioning Plan (end of life) | To provide the preliminary decommissioning at the end of life | Package #6 | Q1, 2023 |
| Construction Management Plan | To provide an overview of OPG's oversight during the construction activities to address applicable REGDOCs-2.3.1 and 1.1.2 version 2 requirements | Package #6 | Q1, 2023 |

| | | | |
|---|---|---|---|
| Commissioning and Turn-over Program Management Plan | To provide an overview of the commissioning and turnover to address applicable REGDOCs-2.3.1 and 1.1.2 version 2 requirements | Package #6 | Q1, 2023 |

Note: The documents mark with "*" are also supporting documents for PSAR

**Table 3: Documents Addressing Regulatory Commitments to be Submitted to the CNSC**

| Document Title | Commitment # | Submission Package | Target Submission Date |
|---|---|---|---|
| Geotechnical Investigation Results Report | D-P-9.3 | Package #2 | Q4, 2022 |
| Seismic Investigation Results Report | D-P-9.4 | Package #6 | Q1, 2023 |
| Preliminary Safety Analysis Report | D-C-1.2<br>D-C-2.1<br>D-C-3.1<br>D-C-4.1<br>D-C-5.1<br>D-C-5.2 | Package #2 | Q4, 2022 |
| Radioactive Waste Management Plan | D-C-9.1 | Package #5 | Q1, 2023 |

**Notes:**

1. The documents listed in the table above will address only the aspects related to LTC application of the specified commitments.
2. The Preliminary Safety Analysis Report and Radioactive Waste Management Plan is also listed in Table 2 since there is an overlap between these commitments and the requirements of REGDOC-1.1.2 draft version 2.