



**Written submission from  
Ontario Power Generation Inc.**

**Mémoire d'  
Ontario Power Generation Inc.**

In the Matter of the

À l'égard d'

**Ontario Power Generation Inc.**

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**Ontario Power Generation Inc.**

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Application for a licence to construct one  
BWRX-300 reactor at the Darlington New  
Nuclear Project Site (DNNP)

Demande visant à construire 1 réacteur  
BWRX-300 sur le site du projet de nouvelle  
centrale nucléaire de Darlington (PNCND)

**Commission Public Hearing  
Part-1**

**Audience publique de la Commission  
Partie-1**

**October 2, 2024**

**2 octobre 2024**

Enclosure 1 to OPG Letter, M. Knutson to D. Saumure, **“Notice of Participation at CNSC Public Hearing 2024-H-03 and Written Submission in support of the hearing on the application for the Darlington New Nuclear Project Construction Licence”**

**Enclosure 1**

**OPG Written Submission in support of the  
Hearing on the Application for the Darlington New Nuclear Project  
Power Reactor Construction License  
CMD 24-H3.1**

OPG

Written Submission

In support of the Darlington New Nuclear Project's Application for a  
**Power Reactor Construction Licence**



**ONTARIO****POWER**  
GENERATION

**Electrifying life in one generation.**

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## LAND ACKNOWLEDGMENT

The lands and waters on which the Darlington Nuclear Generating Station (DNGS) and Darlington New Nuclear Project (DNNP) are situated on are the Treaty and traditional territory of the Michi Saagiig and Chippewa Nations, collectively known as the Williams Treaties First Nations.

DNGS and DNNP are within the territory of the Gunshot Treaty and the Williams Treaties of 1923. These Rights were affirmed in 2018 in a settlement with Canada and the Province of Ontario.

To acknowledge traditional territories is to recognize their history, predating the establishment of the earliest European colonies. It is also to acknowledge the significance for the Indigenous people who lived and continue to live upon the land, to acknowledge the people whose practices and spiritualities were tied to the land and water, and continue to develop in relation to the territory and its other inhabitants today.

As a company, Ontario Power Generation remains committed to fostering positive and mutually beneficial relationships with Indigenous people and communities across Ontario.





## Executive Summary

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Ontario Power Generation Inc. has applied to the Canadian Nuclear Safety Commission for a Licence to Construct the first of four BWRX-300 units at the Darlington Nuclear site under the Darlington New Nuclear Project.

This Commission Member Document (CMD) summarizes the evidence that demonstrates OPG meets all the legal requirements of the Nuclear Safety and Control Act (NSCA) and the applicable Regulations. Within this CMD, Ontario Power Generation (OPG) demonstrates that it continues to be qualified to carry on the licensed activities and 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.

Canadian Nuclear Safety Commission (CNSC) approval to construct a reactor facility would support OPG's mandate to add nuclear generation capacity at the Darlington site and would help to ensure reliable nuclear energy remains an important part of Ontario's low-carbon energy mix in the future, in alignment with OPG's Climate Change Action Plan. OPG has committed to be a net-zero carbon company by 2040, in support of Canada's commitment to be a net-zero carbon economy by 2050. According to the Independent Electricity System Operator (IESO) Pathways to Decarbonization Report [R-1], demand for energy is projected to increase across Ontario and clean energy solutions that do not release significant greenhouse gases are required in attaining greenhouse gases emission reduction targets. For nuclear power to play a significant role in helping decarbonization efforts, it must be deployed safely, efficiently, cost effectively and with the appropriate nuclear regulatory and safety oversight.

Small Modular Reactors (SMRs), like the BWRX-300, support the decarbonization objective using technology that is safe, easy to operate, and efficient to construct and maintain. OPG undertook an extensive and rigorous selection process and selected the General Electric Hitachi (GEH) BWRX-300 as the Darlington New Nuclear Project (DNNP) technology for deployment at OPG's existing Darlington Nuclear (DN) site.

### **Nuclear Safety**

Safety was a critical consideration in OPG's technology selection, and the BWRX-300 meets or exceeds regulatory requirements. The BWRX-300 is the tenth generation of the Boiling Water Reactor (BWR) that incorporates the lessons learned in design, construction, operations, and maintenance from over 100 previous BWRs that have been built, operated,

and in some cases, decommissioned. The simplified BWRX-300 design incorporates passive safety features and optimizes safety, operability, and maintainability.

### **Project and Operating Excellence**

OPG is recognized for exceptional performance in nuclear operations within the nuclear industry. As a world leader in nuclear operations, OPG is well positioned to lead a skilled workforce in the operation of new nuclear technology. OPG has a 50-year history of strong safety and operational performance at its two nuclear generating stations. This positive track record is a testament to the diligence and passion for excellence that all OPG personnel are committed to each day, supporting the safe and reliable operation of our facilities.

OPG also has a history of excellent project management success. With the expertise and commitment of qualified partners and vendors, OPG has demonstrated world-class project performance with the successful and safe refurbishment of Darlington units 2 and 3. Success in large projects such as the Darlington Refurbishment, as well as completion of the Lower Mattagami Hydroelectric Project and the Hydro Tunnel at Sir Adam Beck, demonstrate OPG's readiness and capability to undertake the construction of a BWRX-300 unit at the Darlington Site. OPG will continue to ensure the protection of workers, public and environment during the construction phase that will support future safe operations.

### **Indigenous Relations**

OPG acknowledges the Aboriginal and Treaty Rights of Indigenous People as recognized in the Constitution Act, 1982. OPG is committed to its relationship with Indigenous Nations and Communities. OPG's Indigenous Relations policy provides a framework for engagement with Indigenous peoples and communities to advance its reconciliation efforts. OPG regularly reports on the company's activities and progress in achieving the goals found in its Reconciliation Action Plan.

### **Public Engagement and Communication**

OPG has been engaging with the local community for more than 50 years since the construction of our existing nuclear facilities. OPG's relationship with the local community in the vicinity of DN site remains strong due to ongoing open engagement and sustainable partnerships with community stakeholders, including government, media, business leaders, educational institutions, interest groups, and community organizations.

Since 2006, OPG has kept the public and stakeholders informed about DNNP as part of the existing engagement and communications activities for the Darlington Nuclear Generating

Station (DNGS). Topics such as station operations, environmental performance, and the status of projects (including DNNP) are communicated through various methods and forums with the goal of ensuring transparent disclosure of our activities. Specific to DNNP, OPG has kept Indigenous Nations and Communities, the public and stakeholders updated on the status of the project since its inception and continues to make publicly available the relevant documents associated with the DNNP licensing process.

This CMD contains a summary of the information documented in the Licence to Construct (LTC) application [R-2] and associated documents, and the information necessary for the Commission to make its decision associated with the application. This material will also support members of Indigenous Nations and Communities, stakeholders and the public in understanding the proposed activities and the work undertaken to support the LTC application.

In summary, OPG's application for a Licence to Construct a reactor facility demonstrates that OPG has met or exceeded the applicable requirements and has a history of safe and successful operations and project management, all of which demonstrate that OPG is qualified to undertake the construction of a BWRX-300 unit and ancillary facilities at the Darlington Nuclear site.

OPG respectfully requests the Commission approve OPG's Darlington New Nuclear Project Power Reactor Construction Licence for one BWRX-300 unit. OPG also requests that the Commission accept OPG's proposed Financial Guarantee for DNNP as part of the requested Power Reactor Construction Licence.

The Licence Application and supplementary information to the Application are available to the public on OPG's website, [www.opg.com/newnuclear](http://www.opg.com/newnuclear).

## 1.0 OVERVIEW

### 1.1 Introduction

Ontario Power Generation Inc. is the leading supplier of electricity to the power grid in the province of Ontario. We provide safe, reliable, and low-cost power through our nuclear stations at Pickering and Darlington; our hydro-electric facilities; a solar generating station; a biomass generating station; and several natural gas plants. We have safely provided for the electricity needs of the people of Ontario for decades and look forward to doing so for many decades to come. Building on OPG's extensive experience and in partnership with its key contract partners, OPG is proposing to construct the first of four General Electric Hitachi (GEH) BWRX-300 units and ancillary facilities at the DNNP site.

As the largest nuclear power plant operator in Canada, OPG has demonstrated a history of safe operations and project management success which include 100 years of electricity production and more than 50 years of nuclear operating experience.

OPG's capabilities as an industry leader in safe nuclear operations at both its Darlington and Pickering Nuclear Generating Stations continue to be demonstrated by achievements and recognition both at home and internationally.

OPG has showcased its ability to deliver on large scale nuclear projects. In June 2020, after more than three years of safe, quality work, OPG completed the Darlington Unit 2 refurbishment and successfully returned the unit to the grid. This world-class project performance is a testament to the detailed preparations and planning, as well as the expertise and commitment of OPG and its partners to deliver projects on time. The OPG Project Management Office was the recipient of the PMO of the Year: The Americas award in 2023.

The successes and learnings of Unit 2 were further demonstrated in July 2023, when Unit 3 was safely returned to the grid, well ahead of schedule. OPG remains on track and committed to return all four Darlington units to the grid, safely and on time. OPG is demonstrating that with detailed planning and preparation, large nuclear projects can be completed safely, on time and budget, and with quality.

OPG believes operating in an environmentally sustainable manner is directly connected to business success and is essential for maintaining our social licence to operate. Our commitment to operating in an environmentally sustainable manner has garnered recognition from several authorities, including a Gold Level Conservation Certification from the Wildlife Habitat Council. This achievement recognizes the specific efforts of our biodiversity programs, which aim to protect and nurture species and their habitats wherever the company operates.

## 1.2 Purpose

OPG has submitted to the CNSC the “Application for a Licence to Construct a Reactor Facility” for the DNNP [R-2]. This Commission Member Document (CMD) is being submitted to support the public hearing where the Commission will consider OPG's request for a licence to construct the first of four BWRX-300 reactors, and ancillary facilities, at the DNNP site.

This CMD summarizes OPG's application which demonstrates that OPG is qualified to carry out the proposed licensed activities and that OPG will make adequate provisions for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

## 1.3 Scope

OPG is requesting a 10-year Power Reactor Construction Licence to construct a Class 1A nuclear facility at OPG's DNNP site located in the Municipality of Clarington, in the Regional Municipality of Durham. The proposed activities include:

- o the completion of any remaining activities under the existing site preparation licence;
- o the construction of one BWRX-300 power block, which includes the Structures, Systems and Components (SSCs) associated with the Reactor Building (RB), control building, turbine building, radioactive waste building and auxiliaries;
- o the construction of the support structures for up to four BWRX-300 units;
- o the inspection and testing of equipment; and
- o the conduct of fuel-out commissioning (i.e. the commissioning of systems prior to loading fuel in the reactor).

## 1.4 Darlington New Nuclear Project History

Work on the Darlington New Nuclear Project began in the early 2000's with plans to build a large-scale nuclear power plant of up to four units with a total capacity of up to 4800 MWe. On this basis, an Environmental Assessment (EA) was initiated for the

project under the 1992 Canadian Environmental Assessment Act (CEAA) [R-3]. The scope for the assessment included the site preparation, construction, operation, and decommissioning of four nuclear power reactors to produce up to 4,800 megawatts of electrical generating capacity. At the time, a reactor technology had not been selected and the Plant Parameter Envelope method was used as a means of bounding potential impacts on the environment.

In 2012, after extensive public regulatory hearings on the Environmental Assessment, the Darlington New Nuclear Project Environmental Assessment was approved by the Government of Canada and subsequently, the Canadian Nuclear Safety Commission granted OPG a Power Reactor Site Preparation Licence to prepare the site for up to four units.

In 2020, OPG submitted an application for the renewal of the Power Reactor Site Preparation Licence (PRSL). The renewed 10-year licence, PRSL 18.00/2031 [R-4], was granted in October 2021.

In December of 2021, OPG announced its partnership with GEH to develop and deploy the BWRX-300 Small Modular Reactor (SMR) design.

In 2022, site preparation activities in support of the project began and in October, OPG submitted an application for a Licence to Construct for the first unit.

In January 2024, a Commission Public Hearing was held for Determination of Applicability of Darlington New Nuclear Project Environmental Assessment to OPG's Chosen Reactor Technology. In April 2024, the Commission determined that the 2012 Environmental Assessment remains valid for the deployment of four GEH BWRX-300 units at the Darlington Site.

Pending regulatory approvals, construction activities are targeted to start in 2025 and to be completed by the end of 2028.

OPG further plans to submit a Licence to Operate application in 2026. Pending regulatory approvals, the commercial operation of the first unit is anticipated for 2029.

## **1.5 Existing Site Preparation Licence**

The existing Power Reactor Site Preparation Licence, PRSL 18.00/2031 [R-4], allows OPG to conduct the site preparation activities for the future construction and operation of a new Nuclear Generating Station.

These activities include:

- o Construction of access control measures;
- o Clearing and grubbing vegetation;
- o Excavation and grading of the site to an elevation of approximately +78 masl (metres above sea level);
- o Installation of services and utilities;
- o Construction of administrative and physical support facilities outside of the (future) protected area;
- o Construction of environmental monitoring and mitigation systems;
- o Construction of flood protection and erosion control measures; and
- o Construction of temporary shoring systems.

Completed activities under the PRSL included clearing, grubbing and site grading activities to support Unit 1 construction activities. Power and communication sources were also established. Site preparation activities that are in progress include the distribution of services across the site to service future support structures such as the administration building, warehouse and fabrication building, as well as construction trailers including water, power, communications and sewage. Site grading activities are also continuing in support of preparing the site for future units (Units 2, 3 and 4). Installation of temporary shoring systems to support excavation work is also in progress.

Excess soils resulting from site grading activities have been placed in a mound on the northern portion of the DNNP site. Similar to what was done at the Darlington Nuclear Generating Station, after the final completion of all grading activities the mound will be contoured, seeded and planted for long term stability and to blend into the natural landscape.

## 1.6 Licence to Construct Application

In October 2022, OPG submitted an LTC application [R-2] to the CNSC. Following OPG's LTC Application Plan [R-5], supporting packages were submitted per the requirements of CNSC REGDOC-1.1.2 [R-6] and other associated regulatory documents, codes and standards. The packages covered the Safety and Control Areas (SCAs) Identified in CNSC REGDOC-1.1.2 and included the Preliminary Safety Analysis Report (PSAR), which demonstrated the sufficiency of the safety and control measures underlying the design of the BWRX-300.



The submitted licence application and supporting documents underwent detailed review by CNSC staff. In response to CNSC staff information requests OPG provided additional information and clarifications. This supplementary information further supported CNSC staff's detailed technical reviews of the application.

## **1.7 Licence to Construct Commitments and Regulatory Actions**

OPG has met its commitments with respect to DNNP and reports on the status of the project as part of the DNNP annual report. OPG uses the DNNP Commitments Report [R-7] to track OPG commitments and actions arising from the DNNP EA. These include activities, and deliverables associated with the construction phase.

In addition, any other formal regulatory commitments made by OPG as part of the CNSC LTC application review process are captured and tracked as regulatory actions. OPG continues to meet its commitments on the project and reports on their status to CNSC staff on a regular basis.

## **1.8 Description of Site**

As shown on Figure 1, the Darlington Nuclear (DN) site is located on the north shore of Lake Ontario, about 65km east of the City of Toronto, in the Municipality of Clarington, Region of Durham in the province of Ontario, Canada, and is within the Gunshot Treaty and the Williams Treaties of 1923.

The DN site is home to the four-unit Darlington Nuclear Generating Station (DNGS) and the Darlington Waste Management Facility.

As per Figure 1, immediately east of the DNGS on the DN site is the Darlington New Nuclear Project (DNNP) site that is currently undergoing site preparation work in advance of the future construction of the BWRX-300.

The portion of the DN site for the DNNP is the easterly one third (approximately) of the overall DN site. The DNNP site comprises approximately 180 hectares of land which is bisected by the CN railway. The DNNP site is bounded to the north by Energy Drive, to the south by Lake Ontario, to the west by Holt Road and to the east by the St. Mary's Cement Plant. Figure 2 illustrates the DNNP site boundary.

The proposed site layout for DNNP construction is shown in Figure 3, with a detailed view depicted in Figure 4.

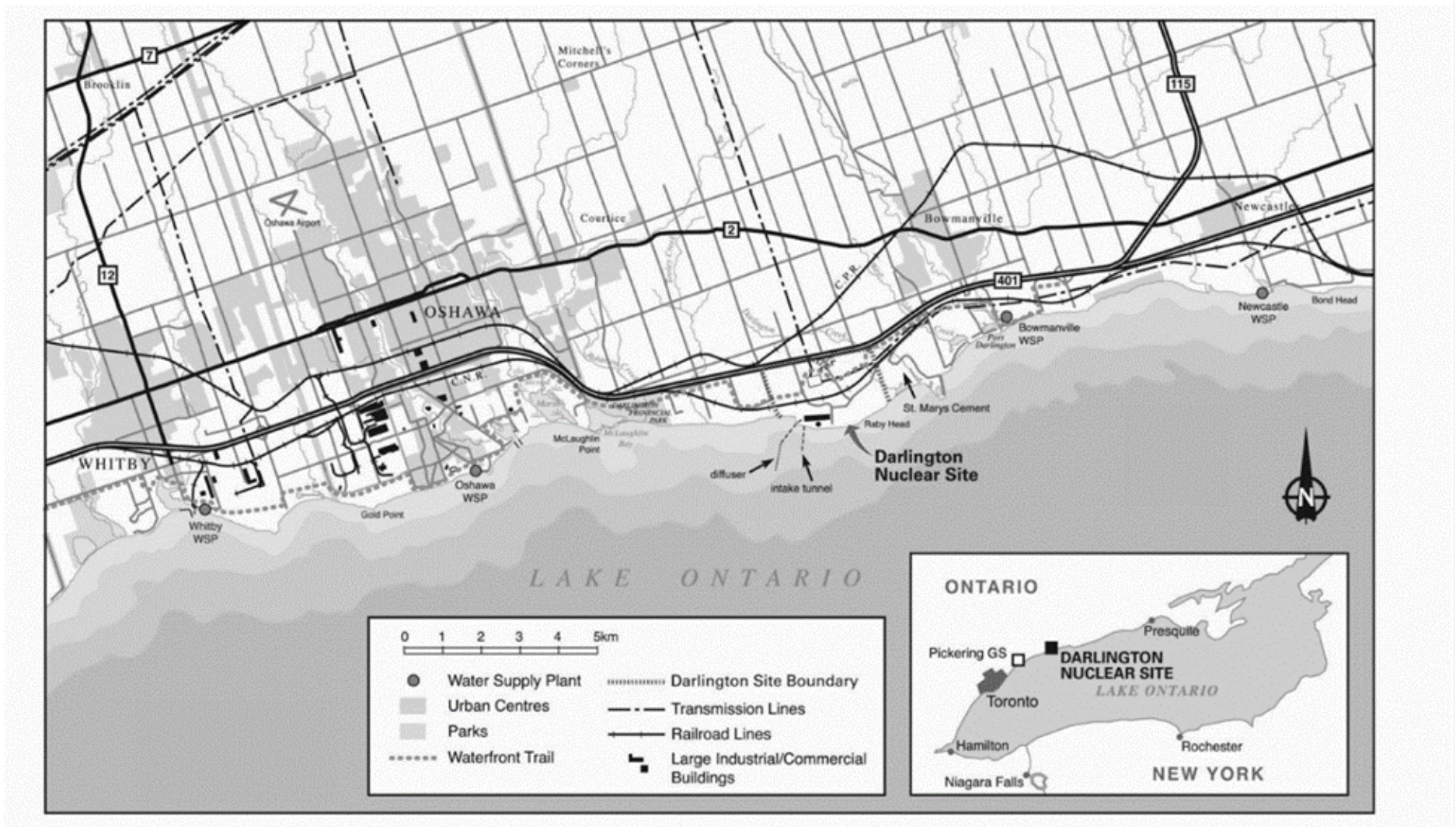


Figure 1: Location of Darlington Nuclear Site





Figure 2: Photograph of DN Site Illustrating DNNP Site Boundary

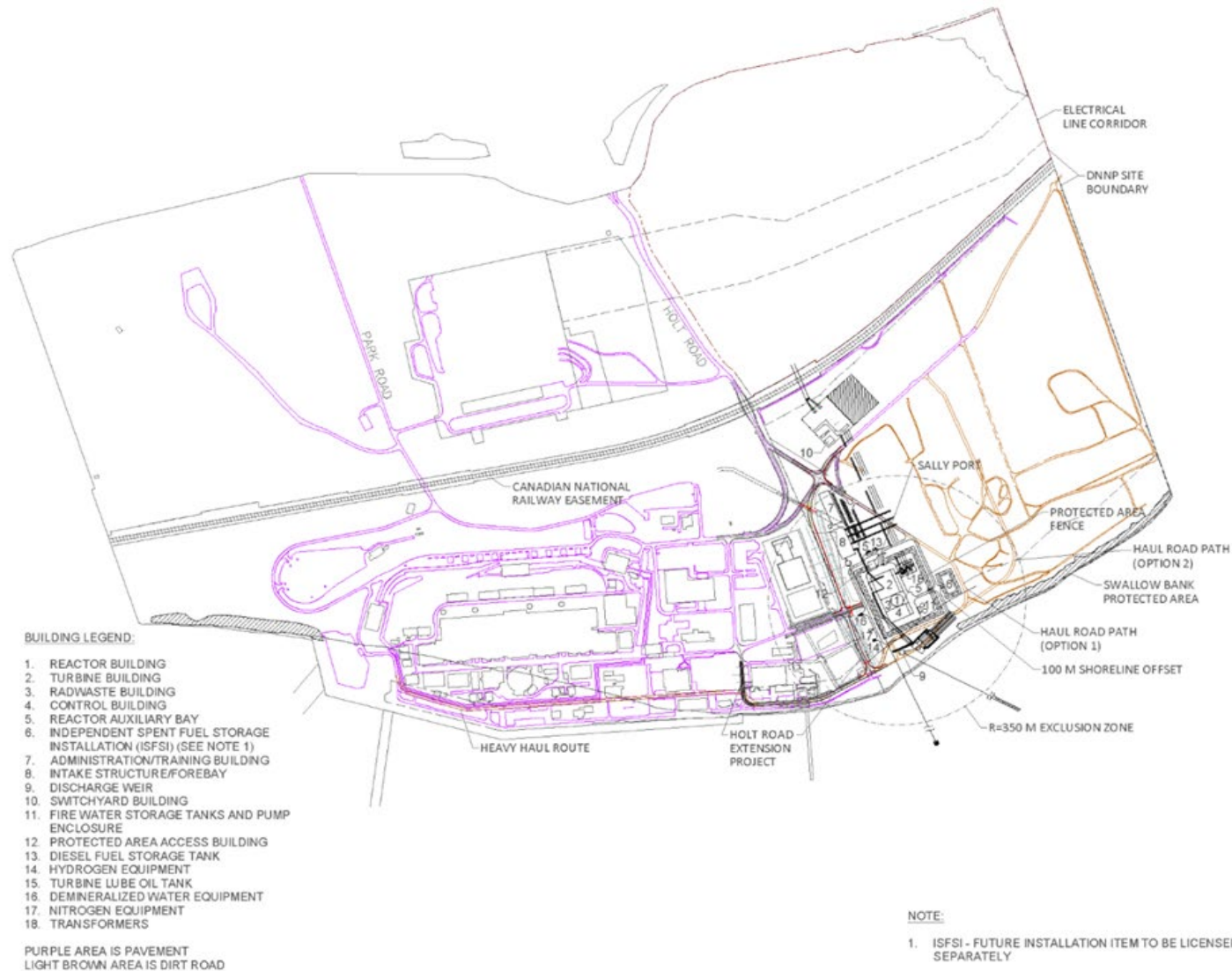


Figure 3: Preliminary Proposed Site Layout for Construction at DNNP Site

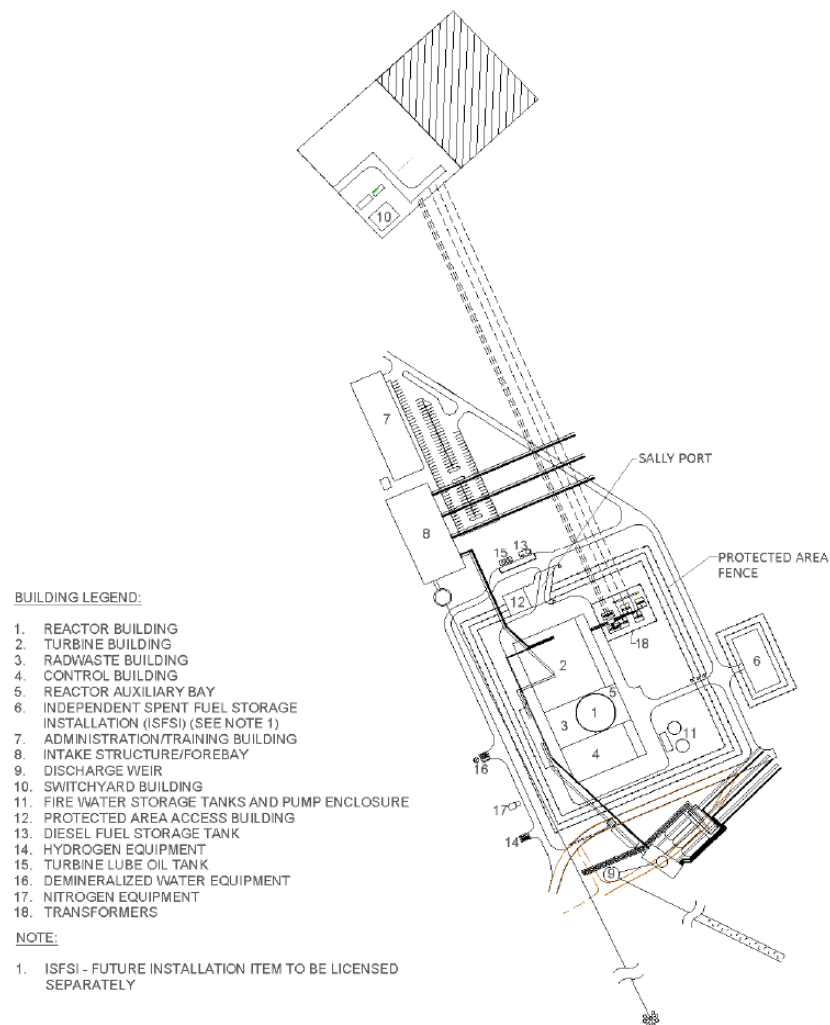


Figure 4: Detailed view of Preliminary Layout of Single BWRX 300 Unit

## 1.9 Facilities to be Constructed Under Current Licence Application

The facilities to be constructed at the DNNP site under the current licence application include the following:

### DNNP BWRX-300 Powerblock

Reactor Building (RB) - A shear wall building made of reinforced concrete, steel or steel-plate composite floors and walls. Fuel handling equipment and pools containing water needed for the BWRX-300 passive cooling systems are in the above-grade portion of the RB. A portion of the RB extends below grade where the Steel-Plate Composite Containment Vessel (SCCV) and the Reactor Pressure Vessel (RPV) mostly reside. The below-grade portion also houses reactor support and safety class systems and most essential power supplies and equipment. The Secondary Control Room (SCR) located in the RB provides safe shutdown capability as a backup to the Main Control Room (MCR).

Control Building - Houses the MCR and electrical, control and instrumentation equipment. It is also the entrance and exit for the BWRX-300 powerblock during normal operations.

Turbine Building – Houses the steam turbine generator, main condenser, condensate and feedwater systems, condensate purification system, turbine-generator support systems, bridge crane, and parts of the off-gas system.

Radwaste Building (RWB) – Houses equipment associated with the handling, processing, and packaging of solid and liquid radioactive waste generated by the nuclear facility. The RWB is used to house equipment and processes that package waste into approved containers.

### Facilities/Buildings Outside Powerblock

Plant Service Area – A warehouse that runs alongside the length of the nuclear facility, providing an area for maintenance and storage.

Security Building – Controls access to the Protected Area and includes a vehicle inspection area.

Lake Water Intake/Discharge Structures - The BWRX-300 at DNNP will use a once-through lake water cooling system. The water intake will be supplied from Lake Ontario to circulate through the condenser and then discharge to the lake through a discharge duct and outfall structure. Additionally, the shoreline of the lake will include shoreline protection to control erosion. Note that these structures are sized adequately to support up to four BWRX-300 units.

Cooling Water System Pump House – Contains the cooling water system pumps and auxiliary equipment needed to cool the nuclear facility.

Switchyard – Hydro one will be building a new temporary switchyard on the north side of the nuclear facility for electrical transmission of the first unit to the Ontario grid. In a future state, all units at DNNP will be directly connected to an expansion of the existing switchyard. The DNNP site may share some infrastructure with the existing DNGS site such as the meteorological tower, sewage lift station, roads and infrastructure to connect the facility to provincial electrical distribution system.



## 2.0 BWRX-300 GENERAL DESCRIPTION

The BWRX-300 is a 327 MWe (approximately) water-cooled, natural circulation SMR. As denoted by the X in BWRX-300, it is a tenth-generation evolution of GEH's Boiling Water Reactor (BWR) design and builds upon lessons learned and improvements from previous generations. The BWRX-300 is an evolution of the 1,520 MWe Economic Simplified Boiling Water Reactor (ESBWR), which has received design certification by the US Nuclear Regulatory Commission (NRC). The expected commercial life of the reactor facility is 60 years.

Figure 5 provides an illustrative view of the BWRX-300 facility at the DNNP site. Figure 6 shows the general layout of the powerblock, and Figure 7 provides a simplified cross section of the powerblock.



Figure 5: An Artist Rendition of a Potential BWRX-300 Layout



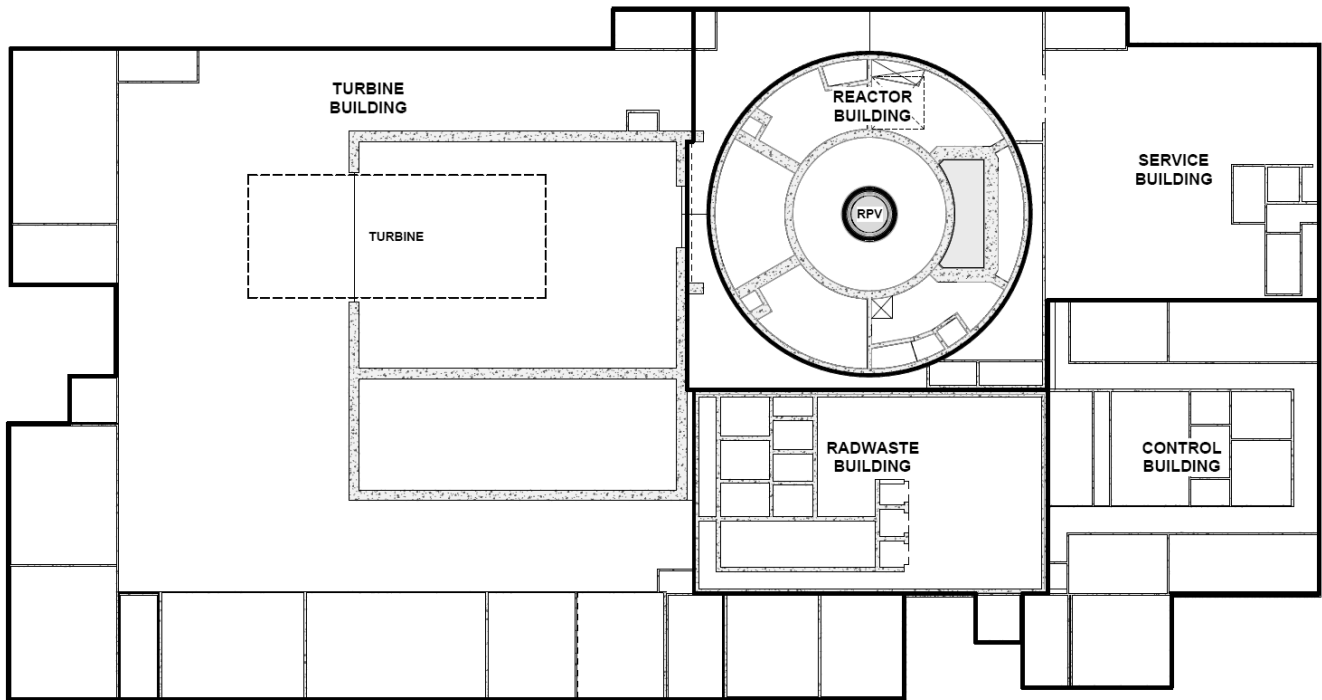


Figure 6: Preliminary DNNP BWRX-300 Powerblock Layout

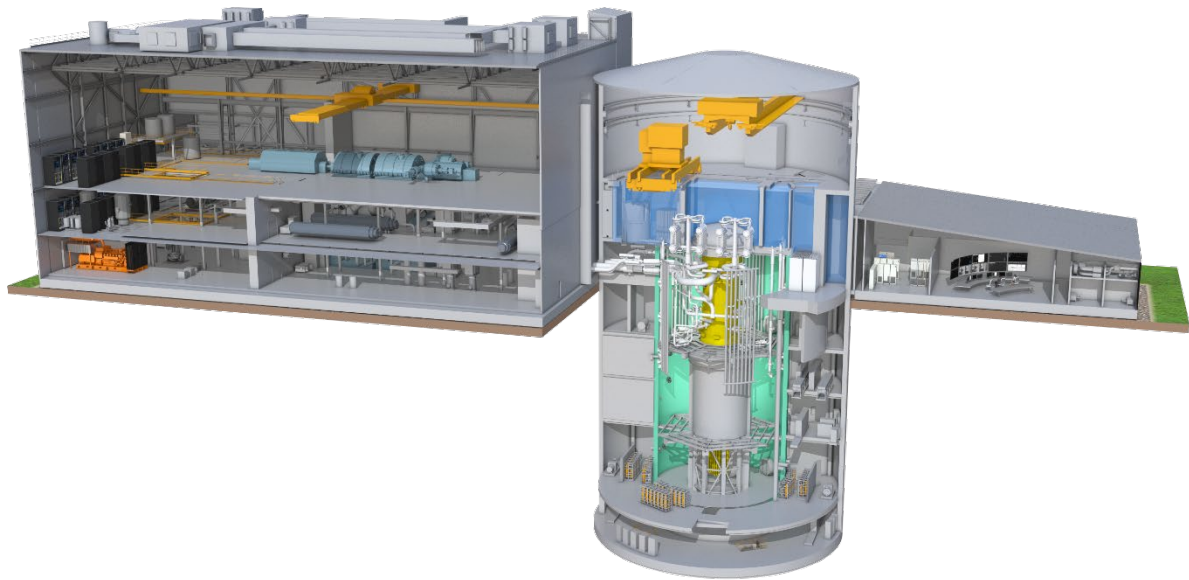


Figure 7: DNNP BWRX-300 Powerblock Conceptual Cross Section

The BWRX-300 uses proven fuel, materials, components, and a combination of established and innovative manufacturing techniques. It implements a safety strategy aligned with international standards and industry best practices to achieve a design with a high level of safety. Its safety is achieved by deliberate design decisions informed by iterative safety analyses.

Though mostly traditional in BWR design, the BWRX-300 incorporates several innovative design features that include:

1. Integral Reactor Pressure Vessel (RPV) isolation valves: The BWRX-300 RPV is equipped with isolation valves that are integral to the RPV that rapidly isolate a ruptured pipe to help mitigate the effects of a Loss of Coolant Accident (LOCA). All large fluid pipes with RPV penetrations are equipped with double isolation valves that are integral to the RPV.
2. Large Capacity Isolation Condenser System: Safety relief valves have been eliminated from the BWRX-300 design, eliminating this as a source of LOCA. The large capacity Isolation Condenser System in conjunction with the large steam volume in the RPV provides overpressure protection.
3. Dry containment: The BWRX-300 has a dry containment. This has been proven to effectively contain the releases of steam, water, and fission products after a LOCA.
4. Standardized equipment as well as in-factory modular construction: Due to its smaller size and inherent safety, the BWRX-300 has been designed to use more standardized equipment than previous BWRs. Where possible, the BWRX-300 design allows for in-factory modular construction. These design decisions help to increase quality of construction and reduce overall cost and time.

The BWRX-300 reactor is designed with negative coefficients of reactivity and thermal hydraulic stability as inherent safety features of the BWRX-300 that provide core reactivity protection. For a loss of coolant accident that results in increased presence of voids in the moderator, the resulting negative reactivity feedback will reduce the reactor power, and thus help mitigate the event.

Simplicity attributes are incorporated throughout the BWRX-300 design, beginning with a simplified system layout that requires fewer systems and components. An example of simplicity in the BWRX-300 design is the reduction in the number of required components which improves not only safety and reliability, but also operability and maintainability. Simplicity is predominantly achieved by incorporating passive safety features. While simplicity has been incorporated to the extent reasonable, where necessary additional features are added to ensure systems are designed to meet

reliability requirements, reduce potential for human error and to ensure defence in depth.

Figure 8 shows a conceptual overview of the BWRX-300 Plant Systems and Table 1 below summarizes some of the basic design parameters for the BWRX-300.

**Table 1: Basic BWRX-300 Design Parameters**

Parameter Description	Value
Current/Intended Purpose	Commercial – Electric
Main Intended Application (once commercial)	Baseload
Output Power (gross)	327 MWe, 870 MWth
Reactor Type	BWR
Core Coolant	H <sub>2</sub> O
Neutron Moderator	H <sub>2</sub> O
Steam Supply System	Direct-cycle
Primary Circulation	Natural
Thermodynamic Cycle	Rankine
Secondary Side Fluid	n/a (No secondary side since it is direct-cycle)
Fuel Lattice Shape	Square
Fuel Bundles	GNF2 (240-bundle core configuration)
Rods per Fuel Bundle	92
Fuel Material	UO <sub>2</sub> with 3.81/4.95% (avg./max. enrichment)
Refuelling Cycle	12-24 months

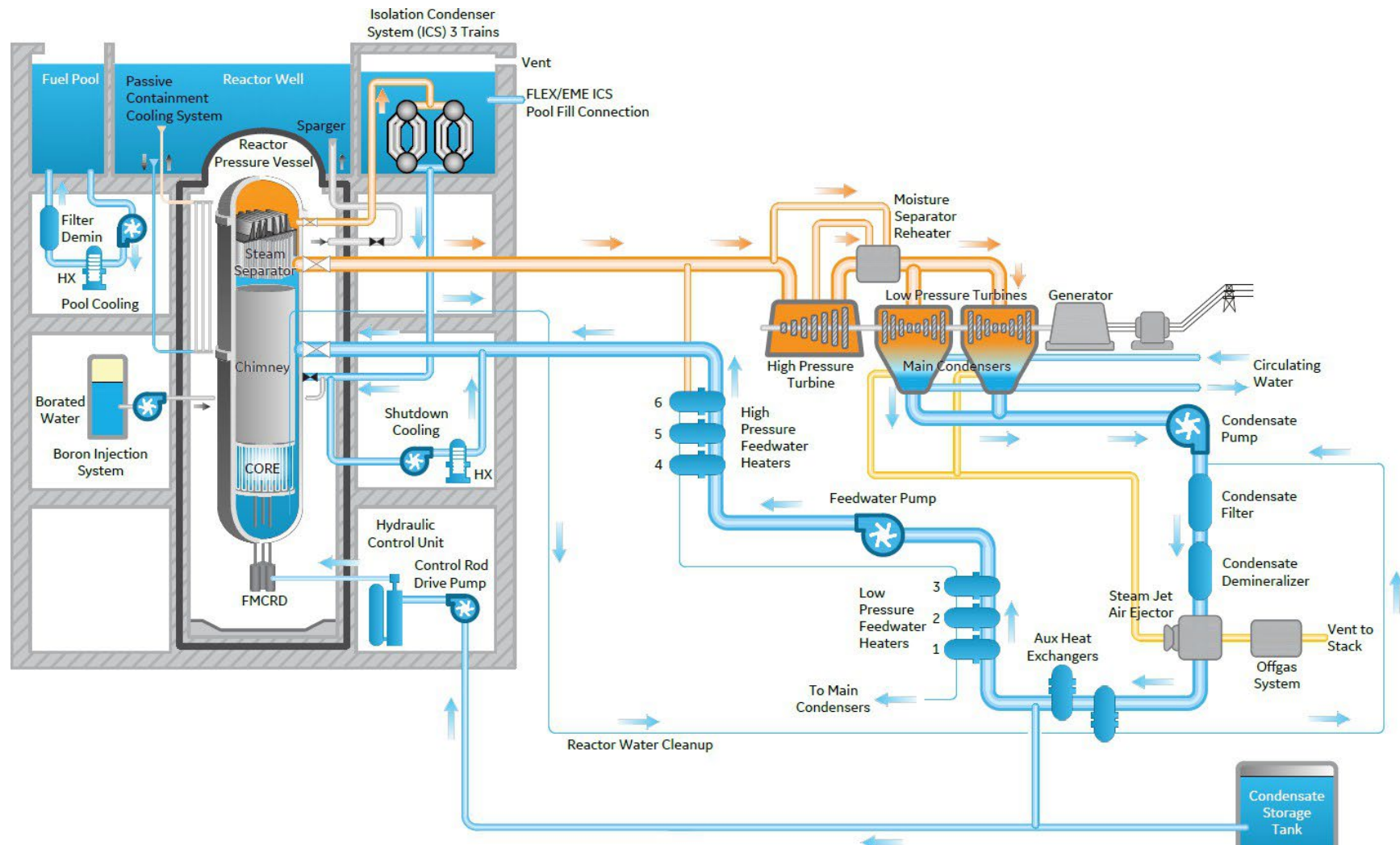


Figure 8: Conceptual Overview of the BWRX-300 Plant Systems

## 2.1 Nuclear Steam Supply Systems and Components

### 2.1.1 Nuclear Boiler System

The BWRX-300 primary circuit or Nuclear Boiler System (NBS) consists of three subsystems: Reactor Pressure Vessel (RPV) and internals, Main Steam, and RPV Instrumentation.

The primary functions of the NBS are to:

- Deliver steam from the RPV to the turbine Main Steam System;
- Receive feedwater from the Condensate and Feedwater System to the RPV;
- Provide overpressure protection of the reactor coolant pressure boundary;
- Provide core support structure to enable the control rods to stop the nuclear reaction when driven in the core by their respective hydraulic control units; and
- Provide the flow path to enable the core coolant to keep the core cooled using natural circulation.

#### **Reactor Pressure Vessel**

The BWRX-300 RPV assembly is shown in Figure 9.

The RPV forms a major part of the reactor coolant pressure boundary, contains the path for reactor coolant flow through the fuel, and generates steam to drive the high pressure and low-pressure turbines. Flow through the core is by natural circulation; pumps are not required to force reactor coolant through the RPV, which removes the reliance on AC power to support reactor cooling.

Natural circulation is enabled by a tall chimney between the top of the core at the top guide to the bottom of the steam separators. The RPV design is such that the level of all nozzles is located significantly above the top of active fuel, which helps mitigate loss of coolant accidents by preserving inventory for core cooling. The large RPV volume, along with the tall chimney region, provides a substantial reservoir of water above the core to preserve reactor coolant inventory, ensure adequate core cooling is maintained and enhance safety by reducing the rate at which reactor pressurization occurs if the reactor is suddenly isolated from its normal heat sink.

The RPV instrumentation monitors the conditions within the RPV over the full range of reactor power operation and shutdown conditions. The RPV, together with its internals, provides guidance and support for the fine motion control rod drives.

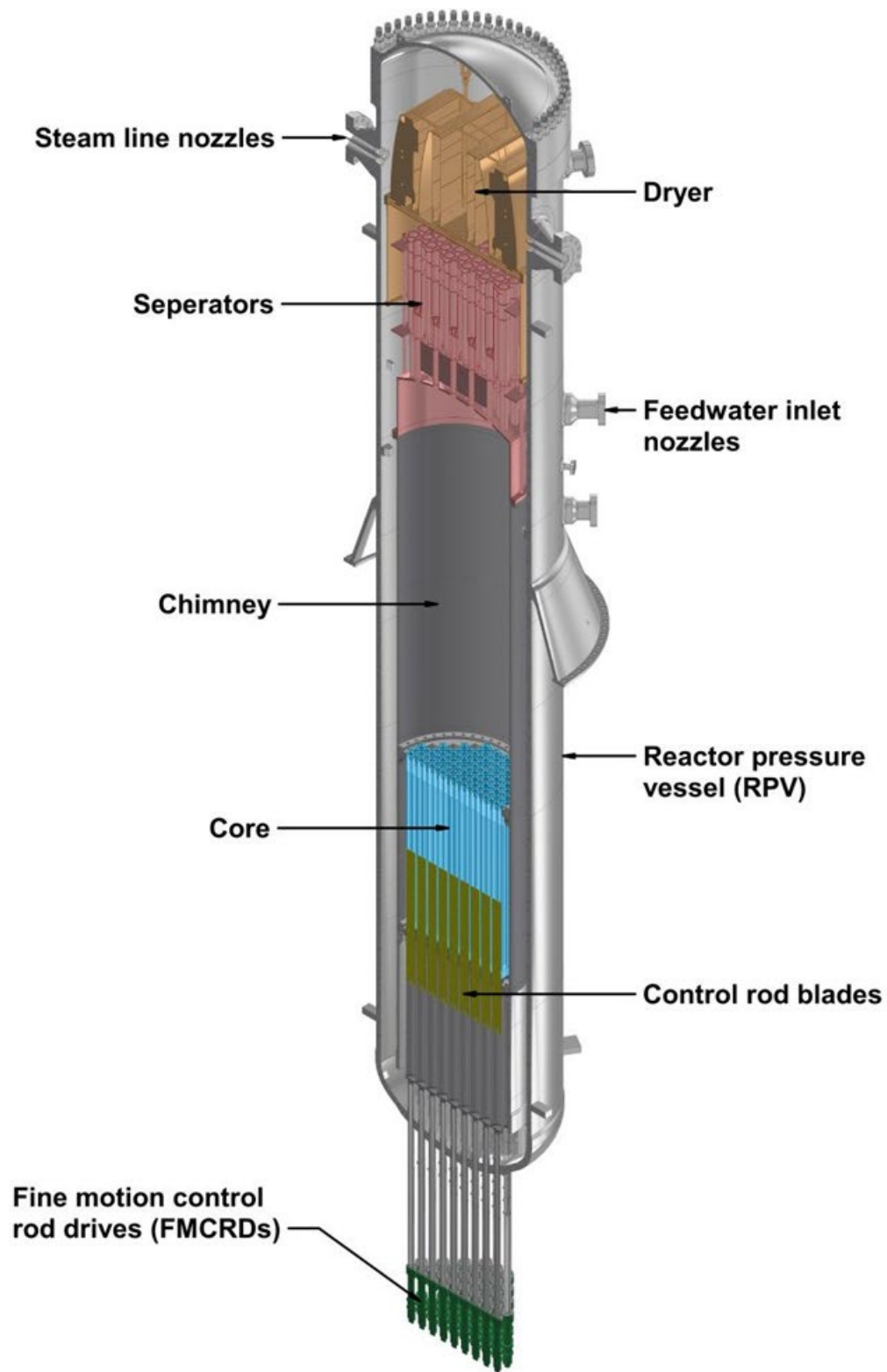


Figure 9: BWRX-300 Reactor Pressure Vessel and Internals



## Reactor Internals

The major reactor internal components include:

- Core (control rods and nuclear instrumentation);
- Core support and alignment structures (shroud, shroud support, top guide, core plate, control rod guide tube, and orificed fuel support);
- Chimney;
- Chimney head and steam separator assembly; and
- Steam dryer assembly.

The fuel assemblies (including fuel rods and channels), control rods, chimney head, steam separators, steam dryer, and in-core instrumentation assemblies are removable when the reactor vessel is opened for refueling or maintenance.

## Reactor Isolation Valves (RIV)

The BWRX-300 design eliminates the traditional non-isolable large break LOCA by utilizing reactor isolation valves (RIVs) integral to the RPV. This feature allows the reactor vessel to be isolated automatically, quickly stopping leakage from the vessel following a downstream pipe break.

The RIV consists of two valves, each independently able to isolate the line. The RIVs are attached to the RPV nozzles for the main steam subsystem, the reactor water cleanup system, the supply and return lines of the isolation condenser system, the head vent, and the feedwater system.

## Nuclear Instrumentation

The nuclear core instrumentation consists of the Local Power Range Monitors (LPRMs), Gamma Thermometers (GTs), and Wide Range Neutron Monitors (WRNMs).

LPRMs are arranged radially throughout the BWRX-300 core to measure neutrons. GTs are in-core devices that convert local gamma flux to an electrical signal; gamma flux is representative of core thermal power. It represents a completely diverse technology to the neutron detecting LPRMs. The GTs are co-located in the instrument tubes with the LPRMs.

The WRNM detectors are distributed radially in the core at fixed heights. Each detector is sensitive to neutrons from fluxes below criticality to greater than 100% thermal power levels.

### 2.1.2 Control Rod Drive System

The BWRX-300 employs two effective means of shutdown that are separate, independent and diverse with the exception of control rods that are shared; there is a single set of control rods for both control of normal reactivity and reactor shutdown. The means of shutdown are designed to function with a high degree of reliability.

The BWRX-300 shutdown system is effective and highly reliable, providing large margins to the probability of failure to shutdown on demand and for contribution of a shutdown failure to the Large Release Frequency safety goal. In case of the highly unlikely scenario that both means of shutdown are unsuccessful (design extension condition), the BWRX-300 design includes complementary design features such as Ultimate Pressure Regulation (UPR) devices and the Boron Injection System (BIS). The UPR devices ensure that, in a design extension condition in the unlikely case that neither means of shutdown are successful, the reactor core pressure boundary integrity is maintained, while the BIS provides an additional means to inject negative reactivity in the core to allow shutdown for beyond design basis events.

The Control Rod Drive System includes three major elements: Fine Motion Control Rod Drive (FMCRD) mechanisms, hydraulic control unit assemblies, and the Control Rod Drive Hydraulic (CRDH) subsystem.

In addition to hydraulic powered scram, the FMCRD motors also provide continuous electric motor-driven run-in of all control rods as a path to rod insertion that is diverse from the hydraulic powered scram. (For clarity, a scram is the sudden shutting down of the reactor by rapid insertion of the control rods). If a rapid reactor shutdown is required, and in the highly unlikely event that the hydraulic reactor scram does not perform as intended, then the reactor is shut down by the independent electric motor run-in of FMCRDs function.

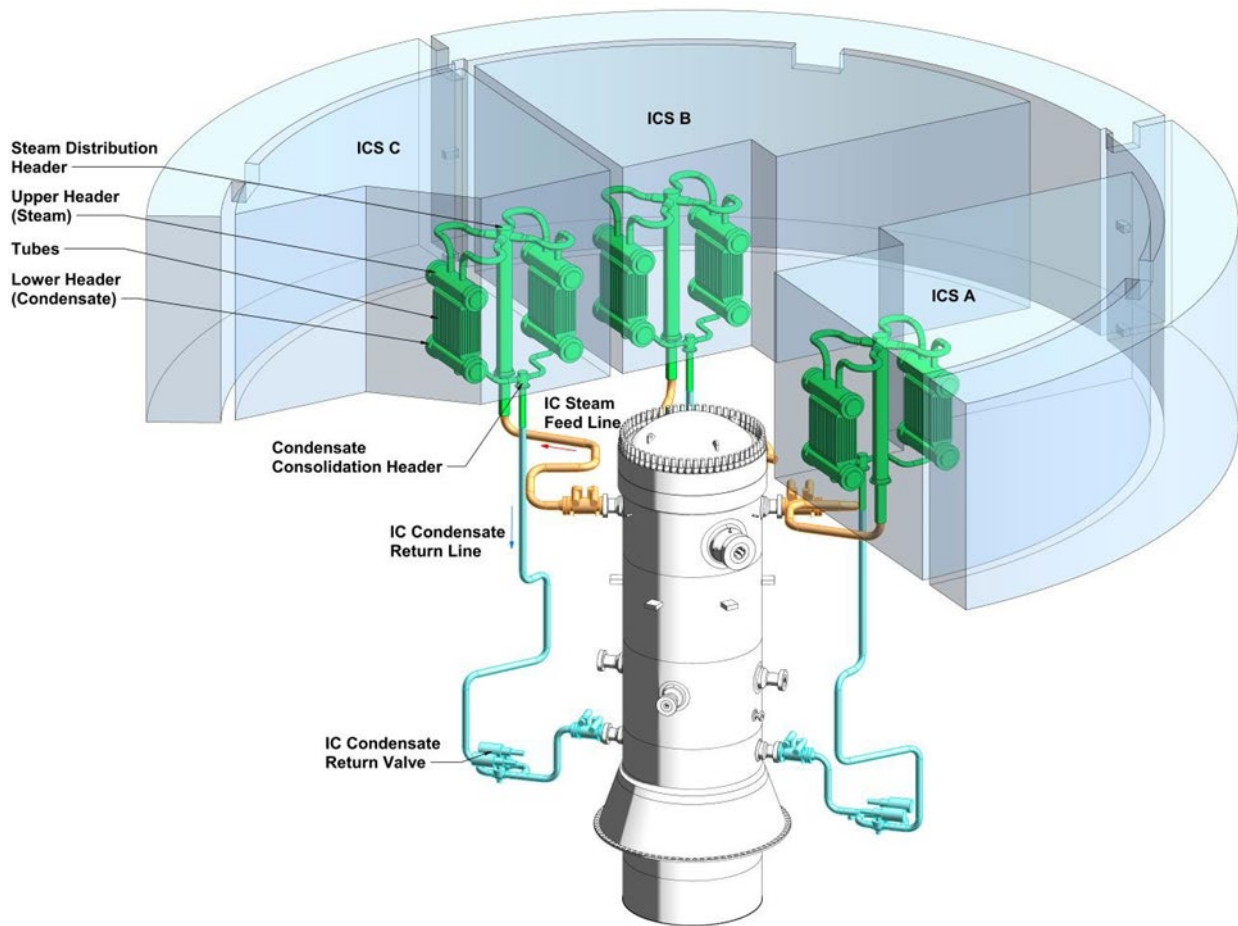
The CRDH subsystem provides clean, demineralized water that is regulated and distributed to provide charging of the scram accumulators and purge water flow to the FMCRDs during normal operation. The CRDH subsystem is also the source of pressurized water for purging the Shutdown Cooling System pump seals and the NBS reactor water level reference leg instrument lines.

### 2.1.3 Isolation Condenser System (ICS)

The Isolation Condenser System (ICS) consists of redundant independent trains, each containing a heat exchanger or isolation condenser that is submerged in a dedicated

pool of water and is connected to the RPV by steam supply and condensate return piping. The complex of ICS pools represents the ultimate heat sink for protecting the reactor core if the main condenser is not available, and the RPV becomes isolated.

When in operation, the ICS removes heat from the reactor coolant. The ICS also minimizes increases in steam pressure and maintains the RPV pressure at an acceptable level through decay heat removal. This is accomplished by condensing reactor coolant supplied as steam from the RPV and returning the condensate back to the RPV in a closed loop. Heat removed from the steam is transferred by the isolation condenser to the water in the pool. The isolation condensers are placed at an elevation above the steam source, causing natural circulation that is driven passively by gravitational force. The arrangement of the isolation condensers is shown in Figure 10.



**Figure 10: Isolation Condenser System**

The ICS capacity is designed such that decay heat removal can be sustained for up to 7 days with no reliance on significant operator action. The ICS pools are located above ground and are not pressurized. Clean makeup water can be added directly to the ICS pools using readily available transportable sources such as a fire truck, enabling fuel cooling to be maintained indefinitely.

The ICS may be placed in service manually from the Main Control Room (MCR), automatically by the protection systems signal or by passive means if a loss of DC power occurs (fail-safe).

#### **2.1.4 Primary Containment System**

The BWRX-300 Primary Containment System (PCS) encloses the RPV and some of its related systems and components, provides radiation shielding, and acts as a

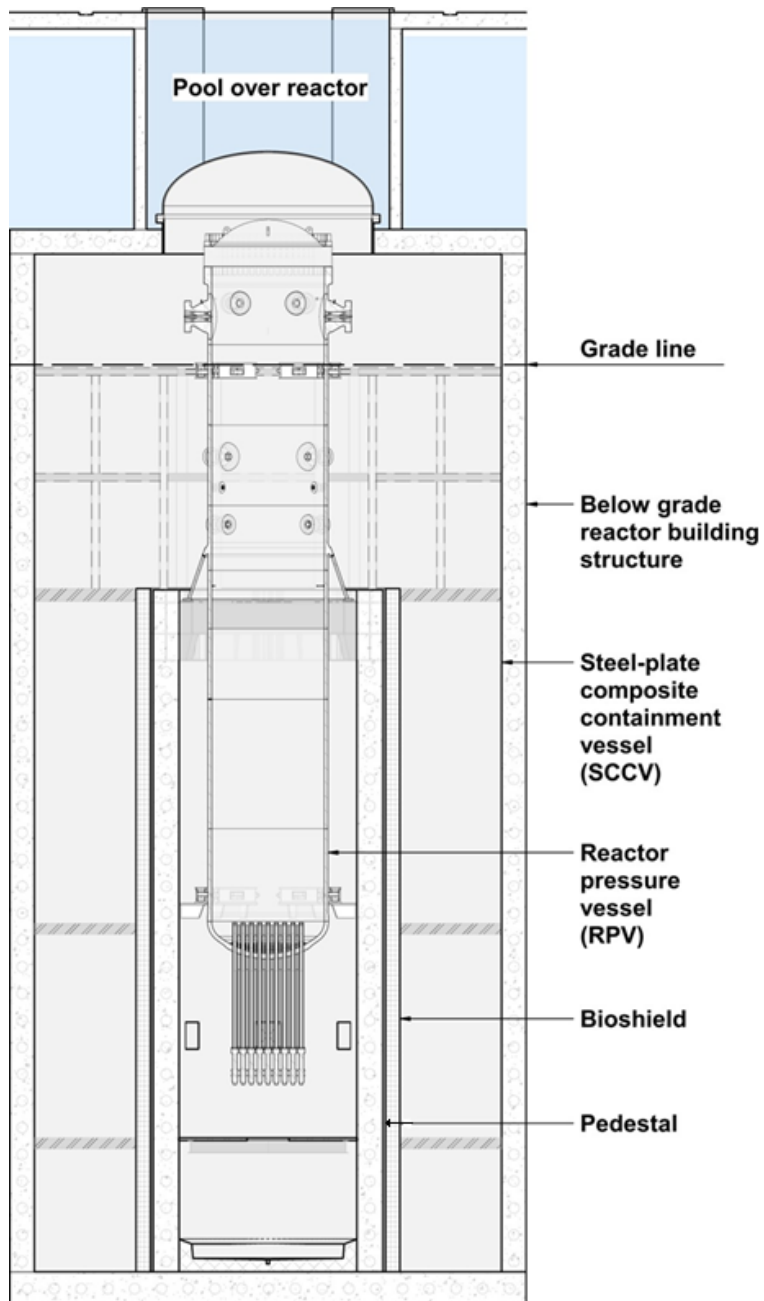
boundary for radioactive contamination released from the NBS or from portions of systems connected to the NBS inside the containment system.

Figure 11 shows a cross-section of the containment system. The BWRX-300 comprises a Steel-Plate Composite Containment Vessel (SCCV), consisting of steel-plate composite cylindrical wall, base mat, and top slab, and a steel containment closure head. The containment structure is completely enclosed within the deeply embedded RB and includes personnel/equipment hatches, containment penetrations, and other safety components. The SCCV is also integrated with the RB and the integrated structure is supported by a common steel-plate composite base mat.

The PCS design uses a nitrogen-inerted containment atmosphere during most operating modes. Atmosphere control is provided by the Containment Inerting System. The inert atmosphere provides dilution of hydrogen and oxygen gases that can be released in a post-accident condition by radiolytic decomposition of water and the released hydrogen from water and fuel cladding (zirconium) reaction during a severe accident condition. The dilution provides protection to the PCS and its internal components from hydrogen combustion or detonation. The inert atmosphere design has the additional benefit of minimizing long-term corrosion and degradation of the SCCV and the contained components by limiting the exposure to oxygen during plant operating service life.

The PCS has provisions for personnel access and for habitability during plant outages to perform maintenance, inspections, and tests required for assuring SCCV integrity and reliability, and the integrity and performance reliability of interfacing SSCs contained inside the PCS boundary.

The PCS is designed for a design life of 60 years of operation plus an assumed 10 years for decommissioning.



**Figure 11: BWRX-300 Dry Containment**

### 2.1.5 Containment Cooling System

The Containment Cooling System (CCS) is used to ensure the containment bulk average temperature is maintained according to technical specifications. It is a

closed loop recirculating cooling system with no outside air introduced into the system except during outages. The CCS is comprised of two fully redundant air handling units. Each air handling unit is cooled by a corresponding chilled water equipment system.

The Steel-Plate Composite Containment Vessel (SCCV) is purged with nitrogen before startup and kept inert during normal plant operation. During outages requiring containment entry, the heating, ventilation, and cooling system supplies filtered, conditioned outside air into the SCCV through piping interface to purge the nitrogen out of the SCCV. In this mode, the SCCV temperature is maintained for personnel comfort by the CCS.

The CCS assists with containment cooldown and limiting containment temperature following a loss of offsite power during the period from hot shutdown to cold shutdown.

#### **2.1.6 Passive Containment Cooling System (PCCS)**

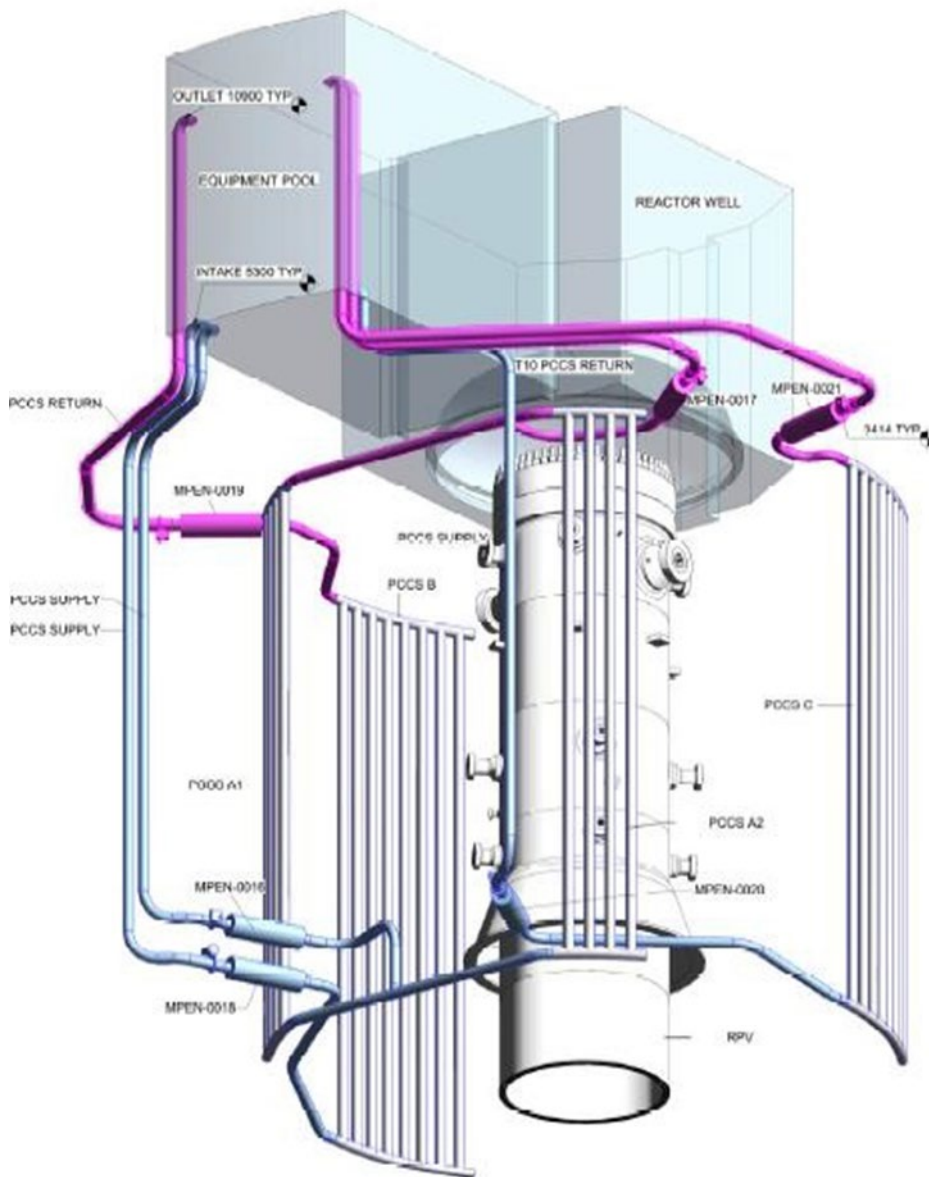
The Passive Containment Cooling System (PCCS) relies on natural circulation to transfer heat from the containment to the equipment pool to maintain containment pressure and temperature within the design limits during accident conditions or loss of active containment cooling. Supply and discharge connections from the pool are connected to closed loop piping within containment. Heat transfer occurs from the containment to the PCCS by natural circulation and condensation. The arrangement for the PCCS is shown in Figure 12.

The PCCS consists of three independent trains of low-pressure heat exchangers that transfer heat from the containment to the equipment pool, which is located above the primary containment system and is filled with water during normal operation.

PCCS operation requires no sensing, control, logic, or power actuated devices for operation. The PCCS condensers are closed loop, and the fluid inside does not contact the containment atmosphere. Since there are no containment isolation valves between the heat exchangers and the containment, the mode is always in "ready standby". The PCCS is in service during normal operation. However, the PCCS does not contribute to the heat removal significantly during normal operation since the containment temperature is maintained by the containment cooling system.

The PCCS becomes effective when steam is discharged into the containment following a pipe break. The steam discharge to containment raises containment temperature and increases the steam content for condensation to occur. Heat transferred to the PCCS from the containment is removed by the natural circulation of water in single phase flow and rejected to the equipment pool.





**Figure 12: Passive Containment Cooling System**

### 2.1.7 Boron Injection System (BIS)

The Boron Injection System is a complementary design feature that supports the Defence in Depth concept (elaborated on in section 4.4.1.1) by being available for events outside of the BWRX-300's design basis. The BIS is capable of introducing sufficient negative reactivity into the reactor primary system to assure a reactor shutdown from the full power operating condition to the cold subcritical state with no



control rod motion. The BIS dispenses the required neutron absorber of natural boron using a Boron-10 solution or equivalent into the core zone to meet the shutdown concentration required throughout the core region while providing reasonable margin for leakage or imperfect core mixing. The system is provided for and only for a situation which causes the normal reactor control system to be unable to shut down the reactor. The BIS acts as an emergency backup to the insertion of control rods to provide a means of making the reactor subcritical in beyond design basis events.

The BIS consists of a storage tank, test tank, injection pump, piping, valves, and instrumentation & control necessary to prepare and inject a neutron absorbing solution into the reactor and to test the system.

### **2.1.8 Shutdown Cooling System**

The Shutdown Cooling System provides for decay heat removal when shutting down the plant for refueling or maintenance. The system is also used to reduce RPV inventory and can be used in conjunction with the reactor water cleanup system piping to reduce RPV thermal stratification.

The Shutdown Cooling System comprises two independent pump and heat exchanger trains. These trains together provide redundant decay heat removal capacity such that each train is designed to remove 100% of decay heat as soon as 4 hours after reactor shutdown. The major components of each train are a pump and heat exchanger, along with valves, piping, instrumentation & control, and power inputs.

## **2.2 Fuel and Fuel Cycle**

The BWRX-300 reactor core includes fuel assemblies, control rods, and nuclear instrumentation.

The BWRX-300 core design includes a 240-bundle configuration. The BWRX-300 fuel uses the well-established and proven GNF2 fuel design which is already widely and safely used within the boiling water reactor fleet in multiple generations of BWR's. The fuel assemblies have low hydraulic resistance that benefits natural circulation.

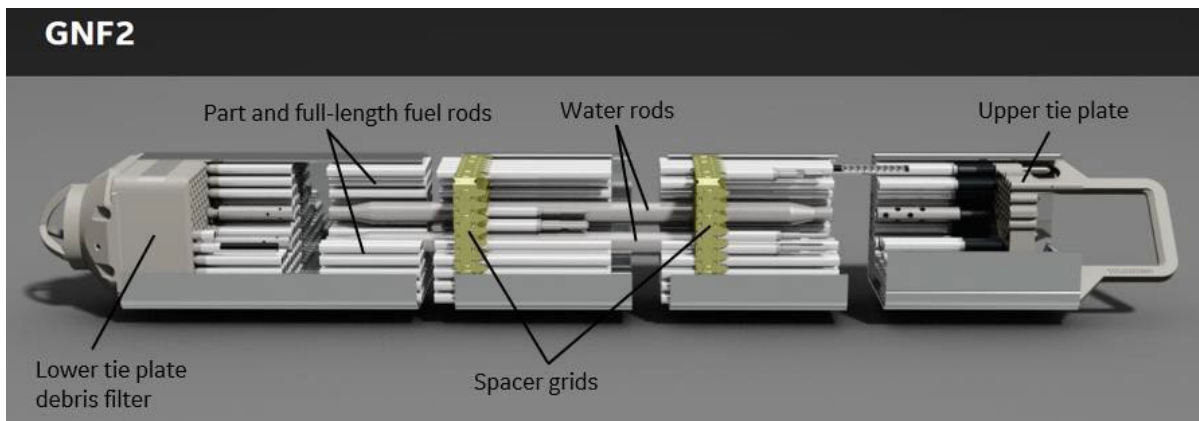
The reactor core of the BWRX-300 is arranged as an upright cylinder containing fuel assemblies located within the core shroud. The core configuration has equal spacing between the control rod and non-control rod sides of the fuel bundle (N-lattice). This

configuration provides more shutdown margin for variations in burnup histories imposed by load following.

A BWR fuel assembly consists of a fuel bundle and a coolant channel. The fuel bundle contains the fuel rods and the hardware necessary to support and maintain spacing between fuel rods.

The channel is a Zircaloy box surrounding the fuel bundle and directing core coolant flow through the bundle; it also serves to guide the movable control rods.

Figure 13 shows the GNF2 fuel bundle design with major components identified. This figure shows the bundle in a horizontal orientation but during storage and operation the bundles are in a vertical position.



**Figure 13: GNF2 Fuel Bundle**

### 2.2.1 Fuel Handling and Refueling Process

The BWRX-300 fuel handling and refueling process takes advantage of historical BWR practices. The refueling process is an intricately scheduled series of tasks to disassemble/assemble the containment head, RPV head, remove/replace the RPV internals to access the fuel assemblies and remove/replace/shuffle the fuel assemblies.

The RB includes a refueling platform (gantry crane) for fuel movement and servicing. The refueling platform spans the reactor vessel and storage pools on tracks in the refueling floor. A telescoping mast and grapple suspended from a trolley system lift and orient fuel assemblies for placement either in the core or in storage racks in the fuel pool.

A position indicating system is provided to locate the grapple over the vessel core and prevent collision with pool obstacles. The mast grapple has redundant features so that no single component failure results in a fuel bundle drop. Multiple interlocks are provided on the refueling machine to prevent mishandling of the fuel assemblies.

Storage racks provide for the short-term and long-term storage of new or used fuel and associated equipment. The fuel storage racks are spaced to prevent inadvertent criticality. Fuel racks are in the fuel pool in the RB. The racks are top loading, with a fuel assembly bail extended above the rack. The rack arrangement prevents accidental insertion of fuel assemblies between adjacent racks and is spaced to allow flow between assemblies for fuel cooling.

### **2.2.2 Fuel Pool Cooling and Cleanup System**

The primary function of the Fuel Pool Cooling and Cleanup System (FPC) is to provide continuous cooling of the water volume in the fuel pool to remove decay energy from spent fuel, and to provide replacement coolant inventory from a variety of sources to ensure spent fuel is kept cool and submerged throughout the life of the plant. In addition, the FPC includes water treatment to maintain coolant quality and to reduce general area dose.

The FPC consists of two trains of equipment, each with a pump, demineralizer, and heat exchanger. A single train is sufficient to prevent boiling in the fuel pool. If both trains are rendered inoperable, the fuel pool is sized such that it can retain sufficient coverage of the fuel for seven days, and the FPC can provide makeup capacity from various sources to ensure pool level during off-normal conditions.

The demineralizer allows for removal of small particulate matter through back-washable filters, with ionic cleanup performed with deep bed demineralization using mixed anion and cation bead resin.

## **2.3 Main Steam and Power Conversion**

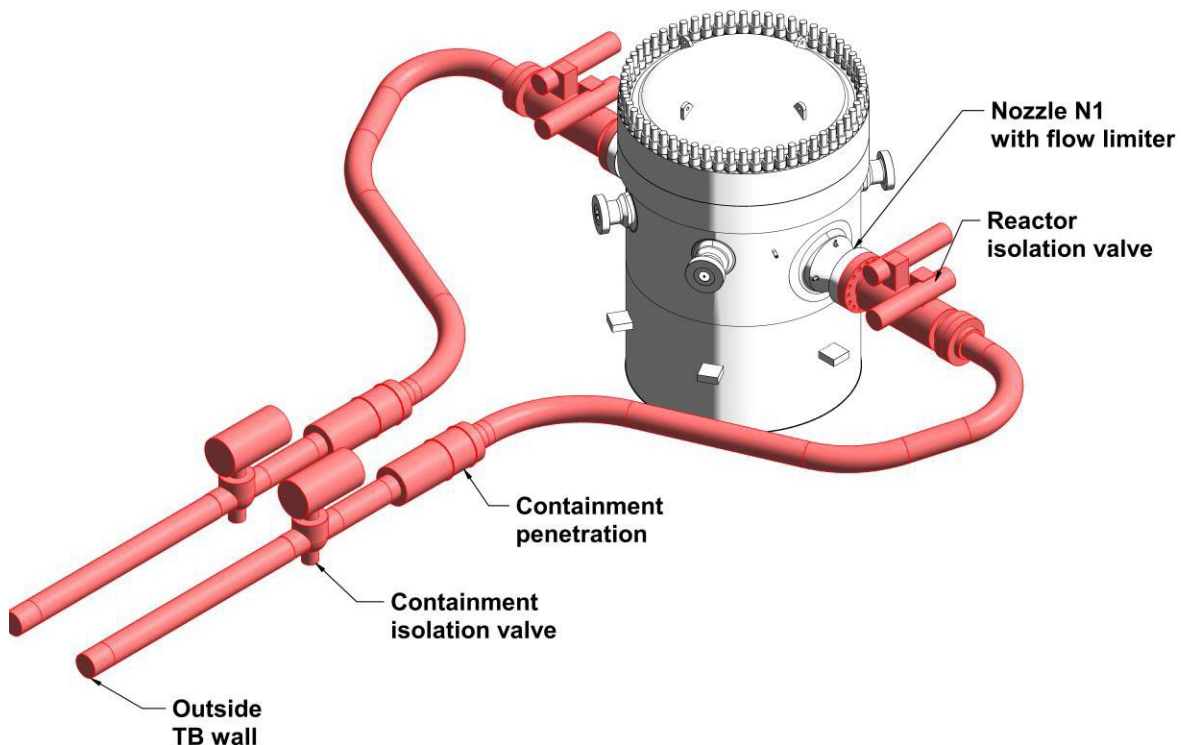
The main steam subsystem consists of two steam lines from the discharge of the main steam reactor isolation valves to the turbine stop valves, the turbine bypass valves, the main steam line drains, and other load isolation/maintenance valves. The supply lines to these loads, all connecting branch lines up to and including their respective isolation valves, and all associated piping supports are also part of the main steam subsystem. Figure 14 shows a typical arrangement for main steam piping.

The main steam subsystem also includes a containment isolation valve on each main steam line. The containment isolation valves are fast-closing and fail-closed type valves that provide the isolation of the containment in the event of accidents or other conditions and prevent the unfiltered release of containment contents that exceed appropriate limits.

The main steam flow restrictors are in the RPV main steam nozzles. The function is to limit the overall steam flow through one steam line when the steam flow exceeds preselected operational limits (if a large break of a main steam line is sensed) and the corresponding isolation valves have not closed.

The main steam line drains transfer any condensate from the main steam lines to the main condenser during startup, low power operation, normal power operation, and shutdown. A reduction in power to a low-level, results in the automatic opening of the air-operated drain line valves, thereby establishing drain flow to the main condenser.

The Turbine Bypass Valves are opened by Instrumentation & Control System when the actual steam pressure exceeds the steam pressure needed by the turbine. One or two bypass valves may be modulated as required in response to changes in the bypass demand. Bypass steam is discharged to the main condenser.



**Figure 14: Main Steam Piping**

The turbine generator receives steam from the RPV via the main steam lines. High pressure steam enters the HP turbine converting thermal energy into mechanical rotational energy. The exiting low-pressure steam then passes through two low-pressure steam turbines where further mechanical energy is produced. The resulting mechanical energy drives the generator to produce electricity.

### **2.3.1 Main Condenser**

The Main Condenser and Auxiliaries (MCA) System is the heat sink for the power generation and normal reactor cooldown and plant startup activities. The MCA System consists of the main condenser, two steam jet air ejectors, and a condenser vacuum pump as well as associated piping, valves, instrumentation, and controls. The main condenser is a single pressure, two-shell unit. Each shell is located beneath its respective low-pressure turbine. The two condenser shells operate at similar pressures and drain to hotwells that are cross connected. Circulating water flows through each of the two single-pass tube bundles to condense the turbine exhaust steam into the hotwells.

The main condenser receives and condenses turbine exhaust steam and turbine bypass steam during all modes of operation. The main condenser provides hold-up for Nitrogen-16 decay to reduce worker radiation exposure and supplies condensate to the condensate pumps. The main condenser also serves as a collection point for other steam cycle miscellaneous drains, vents, and relief valve discharges. The condenser is cooled by the Circulating Water System configured as an open system (i.e. rejects heat to an appropriately sized body of water).

Two steam jet air ejectors are used to maintain the turbine backpressure and remove non- condensable gases from the main condenser. Non-condensable gases extracted from the condenser are exhausted to the Off-gas System.

### **2.3.2 Condensate and Feedwater System**

The Condensate and Feedwater System contains two condensate pumps, two reactor feedwater pumps, three stages of low-pressure closed feedwater heaters, and three stages of high-pressure feedwater heaters. The two reactor feedwater pumps are used to maintain RPV water level. The three high-pressure feedwater heaters are arranged in series.

The Condensate Filters and Demineralizers System (CFD) purifies the condensate to maintain reactor feedwater purity. The CFD uses filtration to remove suspended solids, including corrosion products, and ion exchange resin to remove dissolved solids from condenser leakage and other impurities. The CFD is a full-flow system that consists of high efficiency backwash type filters followed by mixed bed demineralizers.

### **2.3.3 Circulating Water System**

The Circulating Water System (CWS) provides cooling water to the main condenser and transfers heat from the condenser to the environment through the normal heatsink. The CWS also supplies cooling water to reject the heat loads from the plant cooling water heat exchangers through the normal heatsink.

The CWS has two subsystems: the main condenser supply and the plant cooling water supply. The main condenser supply provides cooling water to the MCA during all modes of condenser heat removal. The plant cooling water system consists of two trains, each containing one pump and one heat exchanger, that address the reactor component and turbine component cooling loads.

## **2.4 Instrumentation and Control Systems**

### **2.4.1 Instrumentation and Control Design Architecture**

The BWRX-300 Instrumentation & Control System, also referred to as the Distributed Control and Information System (DCIS), is an integrated control and monitoring system for the power plant. The DCIS is arranged in three Safety Classified DCIS segments and a Non-Safety Class segment with appropriate levels of hardware and software quality corresponding to the system functions they control and their Defence Line (DL) location. The DCIS provides control, monitoring, alarming, and recording functions. The various segments of the integrated DCIS are designed to operate autonomously and independently.

The various DCIS systems are implemented on different hardware and software platforms appropriate to the functions they are performing. It is desirable to use standardized DCIS equipment such that only BWRX-300 application programming need be added; specifically, platforms whose operating systems and hardware have already been designed and adapted for the BWRX-300 requirements.

The BWRX-300 plant has passive safety systems which are actuated via the various DCIS platforms that provide specific safety functions. In general, the safety functions include reactor shutdown (bringing the reactor subcritical), isolation of the reactor vessel and containment, monitoring of reactor power in the power range, initiation of

heat removal and pressure control, and monitoring and control of the plant. The safety systems are automatically initiated upon detection of specific conditions and can be initiated manually by an operator. The safety systems are designed to be fail-safe, so they actuate the safety function upon loss of power. The DCIS also provides for monitoring of post-accident parameters to support emergency procedures and guidelines.

The defined safety functions are provided with high reliability, diversity, independence, and redundancy features. The BWRX-300 has been designed to perform safety functions even with single (and sometimes multiple) failures. The analysis for software-based systems considers common cause failure of the hardware/software platforms to demonstrate that the safety functions can be carried out reliably.

### 2.4.2 Main Control Room

The Main Control Room (MCR) is the primary location for plant monitoring and control during normal, abnormal, and emergency conditions. The MCR includes controls, indications, and alarms that enable operators to perform the defined set of functions during normal operation modes and postulated initiating event conditions. In the event the MCR becomes uninhabitable, or is expected to become uninhabitable, or if functionality is unacceptably impaired, personnel are to move to the Secondary Control Room (SCR). Egress from the MCR and access to the SCR is designed such that required minimum operations staffing can safely transition from the MCR to the SCR.

The MCR is designed with Human-System Interface (HSI) to support tasks such as:

- Assessing the overall status and performance of the plant in any condition and providing necessary information to support operator actions;
- Monitoring the status and trends of key plant parameters (such as reactor power and rates of power change);
- Operating the plant safely during all operational states, automatically or manually;
- Taking measures to maintain the plant in a safe state or to bring it back into a safe state after design basis events and Design Extension Condition (DEC);
- Maintaining the plant within the specified limits and conditions for the parameters associated with plant systems and equipment;
- Monitoring for failure of critical instrumentation and equipment;



- Confirming safety actions for the actuation of safety systems are automatically initiated when needed and that the relevant systems perform as intended;
- Determining the need and the time for manual initiation or intervention of specified safety actions; and
- Implementing emergency operating procedures, Emergency Mitigating Equipment guidelines, and severe accident management guidelines.

The design provides the ability for user selectable display screens and user-defined trending and parameter value monitoring. A robust visual and audible alarming system is provided to alert operators when value thresholds are exceeded. Considering the control technology, the design supports query of control input status (e.g. interlocks, start permissive, auto-start signals) at the point of operation. The Safety Parameter Display System is integrated in the overall MCR HSI designs.

### **2.4.3 Secondary Control Room**

The Secondary Control Room is in the Reactor Building. The SCR includes the required HSI that enable operators to perform the defined set of functions required for responding to the identified plant events and conditions for which the MCR cannot be used.

The SCR is designed in accordance with current international best practice codes and standards for control room design, integrating results from Human Factors Engineering (HFE) analyses and specified HFE design requirements.

The SCR is utilized to perform the functions required to keep the plant in a safe state when the MCR is unavailable. The required functions are derived from safety and HFE analyses.

## **2.5 Electrical Systems**

The BWRX-300 Electrical Distribution System (EDS) is an integrated power supply and transmission system. The EDS is arranged like the DCIS with three safety classified segments and a non-safety classified segment with appropriate levels of hardware and software quality corresponding to the system functions they control and their safety rating.

Each subsystem has appropriate levels of hardware and software quality (corresponding to the systems they power) to provide power to plant loads and a transmission path for the main generator to the utility switchyard/grid. The EDS is monitored and controlled by plant operators from the MCR. Various segments of the EDS are designed so they can operate independently.

There are two transmission lines of off-site power to the plant, to improve reliability and operational flexibility, that power the plant's auxiliary loads. The BWRX-300 maintains passive safety features that are not reliant on a switchyard off-site AC power source. Passive safety features require no power for the initial 72-hours to maintain a safe state.

### 3.0 BWRX-300 CONSTRUCTION OVERVIEW

Based on lessons learned from previous nuclear and non-nuclear projects, including the ongoing refurbishment of the Darlington Nuclear Generating Station, OPG understands that detailed front-end planning is critical to the successful completion of new nuclear construction.

OPG continuously seeks opportunities to reduce the carbon footprint during construction of a new reactor facility. During site preparation, approximately 7000 tonnes of greenhouse gas emissions were avoided by storing spoils on site. Additionally, OPG has utilized temporary on-site power in lieu of diesel generators to support construction and is utilizing locally manufactured cement to reduce the transport distances for trucking concrete on site. OPG will continue to review construction best practices including a review of the use of materials to identify and implement opportunities to minimize environmental impact.

#### 3.1 Plans for Component Manufacture and Plant Construction

Many of the components utilized in the BWRX-300 have been used extensively in the nuclear and power industries and have a well-established supply chain. For example, the BWRX-300 high pressure turbine will be factory assembled, a method that has been used effectively in the industry. This approach eliminates the need for open-top or open-ended assembly of tolerance critical equipment in a construction environment, reducing the risk of foreign particle entry, and minimizing exposure of the internal components to the elements. Assembling this equipment in a shop environment by craftspeople that perform these tasks on manufacturer-specific equipment on a daily basis will also improve quality. Such quality improvements are valuable to the safety of the plant. Figure 15 shows a rendering of high and low-pressure turbines for the BWRX-300.



**Figure 15: Conceptual illustration of BWRX-300 High and Low-Pressure Turbines**

The BWRX-300 also draws from proven construction methods from within and outside of the nuclear construction industry. The design utilizes modularized construction for large components that can be consistently lifted, set, aligned, and fixed in place, resulting in better quality control, efficiency, reliability and construction schedule benefits.

The modularized construction will be conducted in three stages:

- Shop fabrication and pre-assembly of the largest standard shipping load to site;
- Site fabrication to further assemble material to the largest feasible size for setting with equipment available at site; and
- Final in-place assembly.

As part of normal project processes, a construction plan is used to support detailed construction sequencing for determination of travel routes, laydown areas, fabrication and storage facilities, and general construction site layout.

### 3.2 Material Excavation

The key excavation feature is the reactor shaft development. Straight line shaft excavation will minimize material removal and backfill requirements. Standard techniques used by tunneling and hydraulic industries will be used to accomplish this excavation.

### 3.3 Diaphragm Plate Steel Composite (DPSC) Construction

The Reactor Building will utilize Diaphragm Plate Steel Composite (DPSC), a material that leverages the combination of strength from concrete and steel interaction while minimizing the use of rebar. The DPSC Structural System will be used for the walls, floors, and specific substructures of the RB. It utilizes steel plates that provide both strength and permanent concrete forming as well as shear studs that provide a composite action between the steel and concrete. It also provides the ability to prefabricate, install, and connect DPSC assemblies into larger modules. The use of rebar is minimized with this type of construction. The DPSC Structural System allows for the construction efficiencies gained from modularization to be realized, while maintaining a proven safe and reliable structure. A visual depiction of the DPSC is shown in figure 16.

While the DPSC Structural System planned for DNNP is a new variation of steel composite design specific for this project, steel composite construction is a proven technology that has been used widely in the construction industry. Steel composite designs have also been used for construction of safety related structures in previous nuclear projects such as the AP1000 reactors constructed at plant Vogtle in Georgia, USA. In order to ensure the robustness of this construction technique, GEH in partnership with the US Department of Energy has undertaken a series of tests utilizing this construction technique. The results of these tests have been summarized and provided with both the CNSC and US NRC.

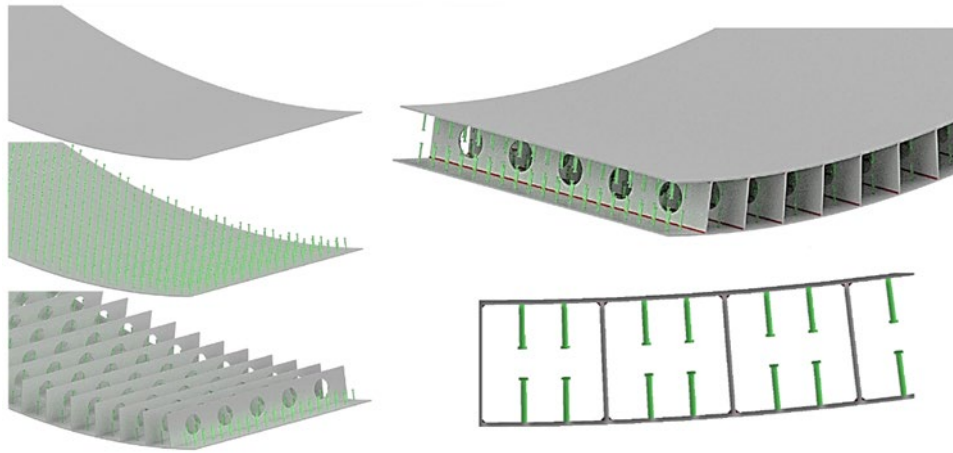


Figure 16: Diaphragm Plate Steel-Plate Composite (DPSC)

## **4.0 SAFETY AND CONTROL AREAS**

### **4.1 Management System**

OPG has a mature and effective Nuclear Management System (NMS) that will ensure the execution of activities performed under a Power Reactor Construction Licence are controlled with quality and safety as the overriding priority.

OPG's NMS is a set of processes and programs that brings together in a planned and integrated manner elements required to ensure OPG achieves its safety and business objectives, continuously monitors its performance against those objectives and fosters a healthy safety and security culture. The NMS framework with its programs, processes, standards and other implementing documents ensures that safety is the foremost consideration in management decisions and actions. Project-specific documents define the details of how DNNP meets CSA N286-12 [R-8] management system requirements.

OPG is the Owner and will be the Licensee accountable for the safe execution of the DNNP licensed activities. DNNP will utilize an Integrated Project Delivery (IPD) contract model that maximizes integration and collaboration between contract partners. OPG will have the accountability to ensure management system requirements are met through ongoing oversight for the construction phase activities following the OPG NMS and associated project specific implementation plan documents.

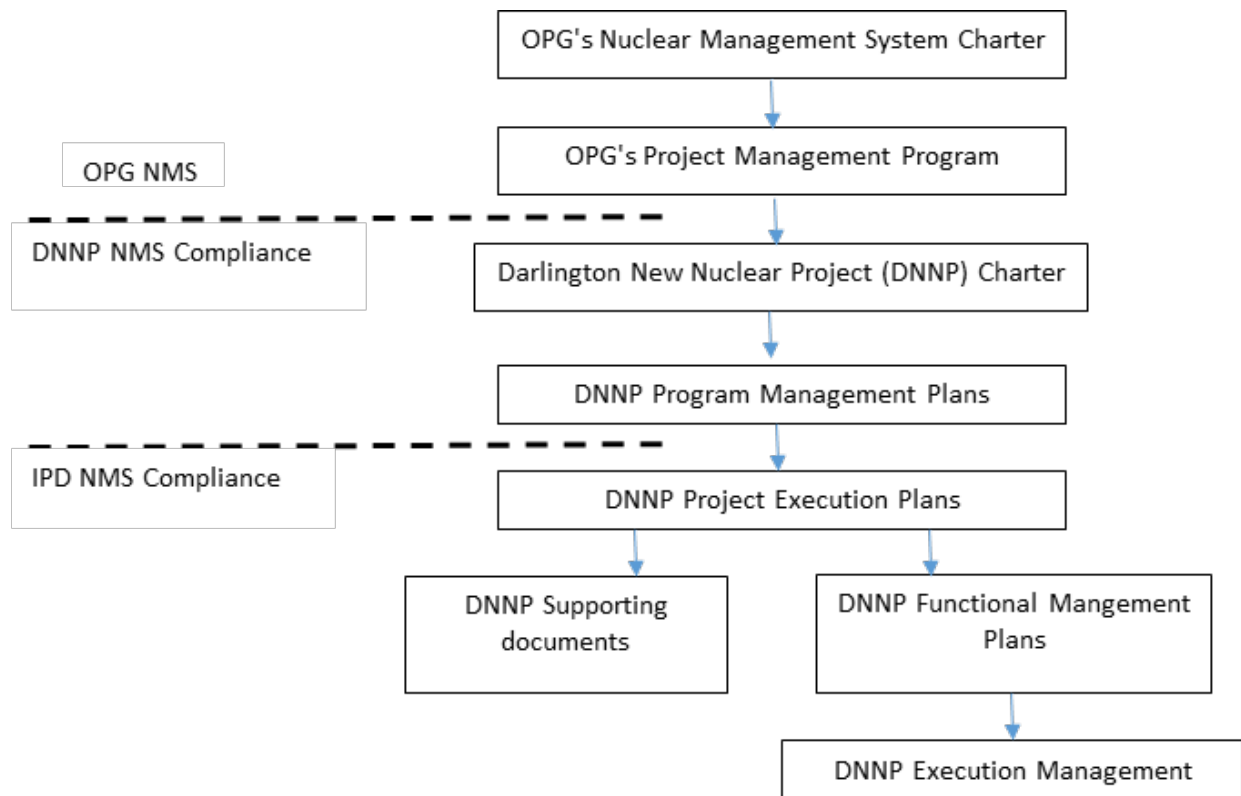
#### **4.1.1 DNNP Management System Governance**

The DNNP will utilize applicable OPG program documents for the construction phase, supplemented by project-implementation documents that ensure compliance with CSA N286-12 clauses related to construction activities. This allows the DNNP to leverage significant experience and expertise to ensure governance utilized by the DNNP maintains the highest levels of quality and safety focus and is suitable for LTC activities.

The generic programs within the NMS applicable to the conduct of licensed activities include nuclear business planning, conduct of regulatory affairs, human performance, performance improvement, training, independent assessment, managing change, information management and cyber security. Existing Project Management and Design Management programs will also be leveraged significantly to execute project specific activities and design oversight.



OPG's management system governance structure to support DNNP LTC activities is described in Figure 17.



**Figure 17: DNNP Management System Governance Document Structure**

The OPG NMS Charter provides overall direction regarding administration of nuclear licensing activities and establishes requirements to which all employees shall comply.

The NMS Charter credits the use of the Project Management Program. This program establishes how the requirements, objectives, and commitments for the management of projects across all business areas within OPG are fulfilled.

The Project Management Program requires the creation of a project charter. A project charter typically describes the business vision and scope of the project as defined by the line of business.

The Project Charter gives authority to the DNNP Program Management Plan, which describes the overall programmatic requirements to design, construct and bring a SMR online. The individual subplans are designed to provide the assurance that all aspects of the program will be conducted in accordance with applicable requirements.

The DNNP Project Execution Plan (PEP) receives authority from the DNNP Program Management Plan and provides the overarching framework to execute the project through the Integrated Project Delivery model. The PEP outlines plans, resources, mechanisms and procedures that implement the Management System requirements for the lifecycle activities of the project through to closeout.

Functional Management Plans receive authority from the PEP and set out specific requirements for implementation of the specific functions in the project such as quality, project controls, and engineering.

Execution Management Plans outline how requirements are met for the specific project bundles such as nuclear island, conventional island and balance of plant.

Each contract partner is required to follow their quality assurance program and management system and is required to meet the applicable requirements of CSA N286-12 for the licensed activities commensurate with the Integrated Project Agreement. OPG has conducted an audit of each contract partner as per the OPG management system to the requirements of CSA N299.1 and N286-12 applicable elements and has qualified them on the OPG Approved Suppliers List. OPG conducts follow-up audits on a regular basis. As the Owner partner and licensee, OPG maintains overall ownership and authority of the DNNP.

#### **4.1.2 DNNP Organization**

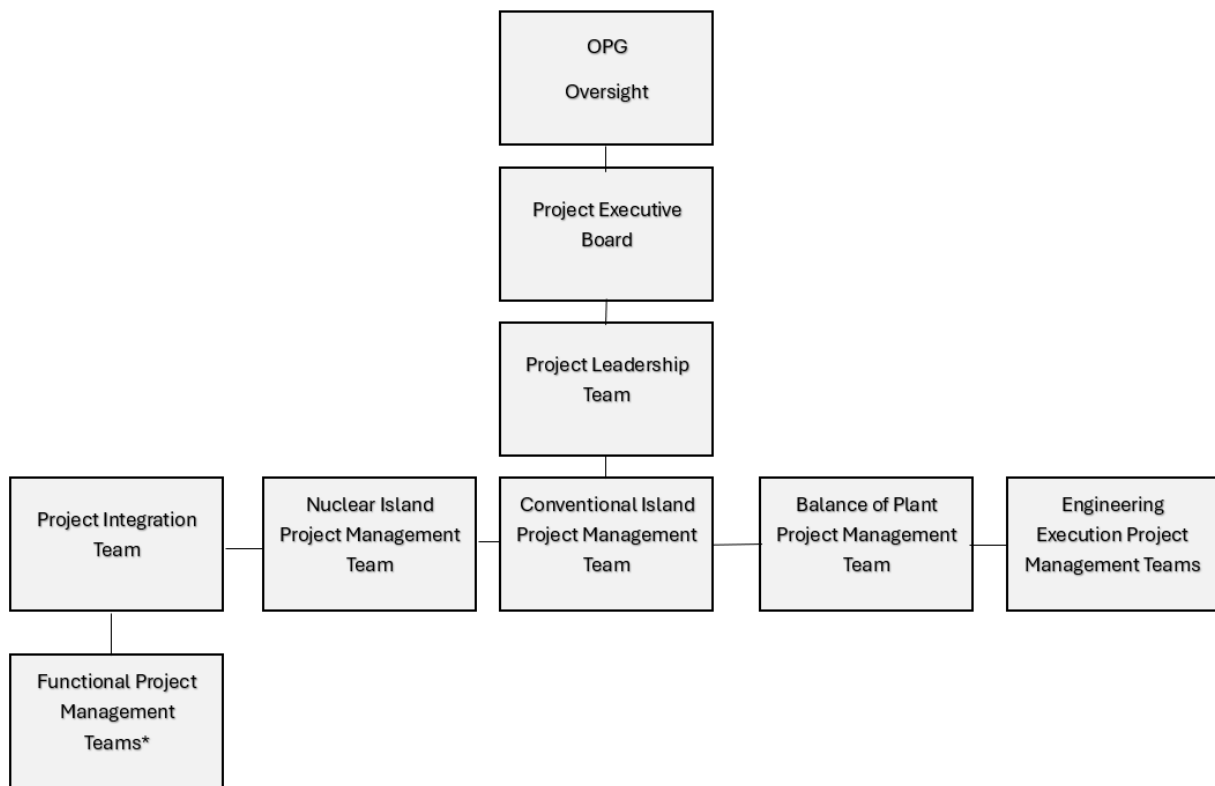
OPG is working with contract partners, General Electric Hitachi, AtkinsRéalis and Aecon to build the DNNP facility under an Integrated Project Delivery model. The project team has a diverse range of expertise and services to develop, engineer and construct a BWRX-300. This includes significant experience with many of the components utilized in the BWRX-300, along with an existing supply chain which minimizes risks for the project.

Each partner will play a specific role on the project:

- OPG: The owner and licence holder; OPG will maintain overall responsibility for the project, including oversight of licensed activities, operator training, commissioning, Indigenous engagement, and stakeholder outreach.
- GEH: The technology developer; provides overall design, procurement of major components and engineering support.
- AtkinsRéalis: The architect engineer; provides design, engineering and procurement support.

- Aecon: The constructor; will provide construction planning and execution.

Figure 18 describes the project organization to ensure oversight and effective project management of the DNNP.



*\*Functional PMTs consist of: Project Controls, Site Management and Construction, Procurement, Engineering, Health Safety and Environment, Operations and Maintenance, Start-up and Commissioning, Communications, Indigenous Engagement, Security and Emergency Management, Regulatory Affairs, Digital Project Delivery, Waste and Decommissioning, Field Coordination*

**Figure 18: DNNP IPD Organization**

The Executive Board is composed of one executive from each of OPG, AtkinsRéalis, Aecon, and GEH. The Executive Board is responsible for strategic oversight of the project and provides executive-level collaborative guidance for the Project to achieve the project objectives. While decisions are made by the Executive Board, OPG as licensee and owner retains the authority to issue directives to the project.

Owner oversight consists of OPG representatives that are separate from the integrated teams to maintain independence and accountability for the licensed activities.

The Project Leadership Team (PLT) includes one leader from each party. The PLT is responsible for providing project oversight, strategic project decisions, staffing, and overall accountability for DNNP IPD model. The PLT provides management-level collaborative guidance for the project to achieve the project objectives. The PLT provides direction to the Parties and to the Project Management Teams (PMTs). The PLT creates, organizes, manages, and mentors the PMTs. The PLT is responsible for monitoring all project progress and for developing benchmarks, metrics, and standards for progress evaluation.

Project Integration Team (PIT) – This team is composed of one representative from each contract partner. The PIT is tasked with establishing the overall integration of the project execution and functional teams. This includes integration between bundles and functions to ensure consistency in approach, managing organizational structure and governance, and providing oversight on functions and supporting activities.

Functional PMTs – Reporting to the PIT, the functional groups may be comprised of representatives from all four organizations or have a single leadership as appropriate. They ensure project processes are efficient and support the execution of the project, comply with the contract and owner requirements, and will provide resource and strategic direction for their associated functions.

Execution PMTs - Reporting to the PLT, the execution PMTs are the delegated authority for budget, schedule, and risk management. They are accountable for their areas, tactical decision making, work processes, schedule development and the overall responsibility for all aspects of project execution within their assigned scope. Execution PMTs are responsible for accurately reporting on area performance and keeping the team informed on project status.

By engaging highly experienced companies across various aspects including engineering, construction, and operations, OPG is ensuring that design, construction, and safety of its DNNP BWRX-300 plant will meet or exceed regulatory requirements incorporating industry-leading best practices.

#### **4.1.3 Configuration Management and Change Control**

OPG has an established process that ensures design requirements (including safety analysis), physical and operational configuration, and configuration information (operating procedures or drawing) are consistent throughout all project phases.

The Darlington New Nuclear Project has a Configuration Management Plan that encompasses the DNNP Engineering, Procurement, Construction and Commissioning phases. The elements and activities in this plan apply to any personnel who perform or

support licensing, engineering design, procurement, or any other activity that may impact the configuration management of the structures, systems, and components prior to turnover. It establishes a means of configuration change control to maintain consistency and conformity between design requirements, the design, the physical configuration, and configuration information including the inter-relationships and mutual integrity through status and revision control.

The oversight activities performed by OPG are applied using a graded approach such that complex or safety significant activities and deliverables will have more frequent and intrusive oversight. The intent of intrusive oversight is to proactively inquire to assess results and behaviours while ensuring gaps are identified, and drivers are understood, actions are taken and results are verified to achieve desired performance. The oversight is intended to ensure ongoing conformance of the engineering products or deliverables in accordance with the applicable management system.

#### **4.1.4 Safety Culture**

OPG and contract partners foster a healthy nuclear safety and security culture among all employees throughout all phases of the facility's lifecycle to ensure the protection of workers, the public and the environment.

A healthy nuclear safety and security culture is integrated and promoted through the management system policies, programs, and procedures.

All employees are accountable to conduct themselves in a manner consistent with the "INPO Traits of a Healthy Nuclear Safety Culture" [R-9] and to maintain vigilance such that:

- Nuclear Safety and Security are the overriding priority in all activities performed in support of the DNNP.
- Nuclear Safety has clear priority over schedule, cost, and production.

The DNNP Nuclear Safety and Security Culture Program establishes a framework to ensure the ongoing monitoring of safety culture including the execution of comprehensive, systematic and rigorous safety and security culture assessments. The cyclical assessment of safety and security culture allows for continuous focus to maintain a healthy safety and security culture throughout the project.

## 4.2 Human Performance Management

OPG's human performance program ensures that sufficient personnel are in place in all relevant job areas and have the necessary knowledge, skills, procedures, and tools in place to safely carry out their duties. OPG ensures its projects partners also have human performance programs in place.

The principles of human performance will apply to the lifecycle of the DNNP facility throughout all stages of design, construction, operation, and decommissioning with a graded approach that is commensurate with the level of risk.

OPG ensures that its workers, as well as project partner staff are qualified, and possess the necessary competencies to perform their work safely, meeting established standards and expectations set by OPG management. Workers rely on OPG procedures or equivalent, which encompass a wealth of industry operating experience to execute tasks event-free. Human performance is monitored using established processes and metrics.

OPG fosters a culture of open reporting of events following established processes for human performance event communications and analysis. The fundamental principles of human performance are included in training for all levels of the organization. The training program employs a systematic approach that promotes excellence in worker performance that is based on an understanding how individuals, the environment, organization, and technology interact.

OPG expects that all workers apply themselves to exhibit the behaviours of a nuclear professional. OPG will ensure human and organizational factors are considered throughout the design, planning and construction activities.

### 4.2.1 Personnel Training

OPG's training program provides the structure, processes, and tools for defining, developing, implementing, documenting, assessing and improving the training required to ensure staff have the appropriate knowledge, skill and behaviours for safe and efficient plant operations.

Training and development at OPG are prioritized to build and maintain in-house capabilities to be an informed customer. Knowledge development, transfer and retention plans are put in place to ensure independent oversight and increased technical knowledge. Where identified, third-party reviews are done in parallel with OPG reviews to ensure work is done with high quality.

While OPG is a highly experienced, qualified, competent nuclear operator, it recognizes the value of learning from others. To this end, OPG has established a Memorandum of Understanding with a highly qualified and competent nuclear operator in the US, the Tennessee Valley Authority, operator of three BWRs at Brown's Ferry. Through this partnership, OPG is gaining valuable knowledge and operating experience that will inform OPG's work throughout the project planning, construction, and future operations.

Training for personnel engaged in activities during the construction and fuel-out commissioning phases of the DNNP includes:

- Training for staff, supervisors, contractors and sub-contractors;
- Training specific to commissioning activities;
- Initial Training and Qualification programs for certified staff (including Simulator Training), field operations personnel, control maintenance and mechanical maintenance, and associated OPG instructors;
- Where applicable, use of existing Nuclear Training Programs including revisions as a result of DNNP technology; and
- Scheduling and timing of training program delivery.

The initial training and qualification programs will also support the certification of staff, which will be completed as part of an application to operate the reactor and prior to fuel-in commissioning.

Contract partners are responsible for the training and qualification of their staff, supervisors, contractors and sub-contractors under their respective management systems.

OPG provides personnel with site specific information where needed. Skilled trades staff are required to hold journeyman status and certificate of qualification as appropriate. Apprentices work under the accountability of a journeyman when performing tasks associated with the skilled trade.

Additionally, contract partners maintain records of staff certifications, licences, professional designations, training and qualification (applicable to activities conducted on the project) and make them available for OPG review upon request.

Any workers who require access to the DNGS protected area and/or tie-ins to existing DNGS station systems or equipment, will undergo training and qualification under the DNGS training program as required prior to commencement of the work.



The revision, development and delivery of training for staff who will commission, operate and maintain the new station will follow OPG's applicable Nuclear Training Programs, and all applicable standards and procedures taking authority from the program.

Development and delivery of DNNP specific initial training and qualification for workers, including certified staff, will follow a Systematic Approach to Training (SAT) that focuses on BWR technology and the DNNP management system. This includes the identification of performance requirements and definition of worker training through analysis, the design and development of training to support proper job performance and individual development, implementation of training and examination processes, as well as examination security, development, and approval processes.

#### **4.2.2 Personnel Certification**

As part of future operations, OPG will develop programs that ensure persons seeking a certification or renewal of a certification issued by the CNSC for a designated position referred to in the DNNP operating licence are qualified to carry out the duties of that position in accordance with the NSCA and the regulations made under the Act.

The certification of personnel will be included as part of the next licensing phase. The sections below provide an overview of the current programs and processes for certifying personnel. These will be adapted to support certification of personnel for the future operations at DNNP.

Personnel certification is governed under OPG's certification program. The program is mature and robust and conforms with applicable CNSC regulatory documents.

As discussed in the previous section, required skills and competencies for certified positions are identified through OPG's Systematic Approach to Training. The objective of the SAT is to guide the development of performance-based training to support job performance requirements and individual development.

Personnel involved in development and conduct of certification training programs are required to be qualified. All qualifications are developed, implemented, approved and revised following established processes and documented in Training and Qualification Descriptions (TQDs) and guides.

TQDs define the initial training and qualification requirements for each of the positions requiring certification, and for each of the certification training program instructors and examiners. These TQDs describe each phase of the initial training programs. Upon

successful completion of the training phases, including required certification examinations, candidates are eligible to receive a CNSC certification.

TQDs will be developed for each of the positions requiring certification at the DNNP. A qualification guide will be developed that describes the initial and continuing training for DNNP operations certification training instructors and examiners.

Positions requiring regulatory certification will be based on the technology needs and safety significance. The roles and responsibilities for each designated position will be described in a series of role documents that will be developed as operating documentation becomes available.

The training program for certified staff will be developed as design and operating documentation becomes available. Based on simplification of the design and the advanced safety features incorporated in the BWRX-300, it is anticipated that the SAT-based certification training programs will be less complex than the current programs at other OPG facilities.

Training for certification of staff required under a future operating licence will include the use of a full-scope simulator. The full scope simulator will be a replica of the BWRX-300 Main Control Room hardware panels and instrumentation, telephone and communications systems, radiation and fire emergency tones and public address system. It will include the simulation computers and servers required to provide plant system modeling, simulator operation and Instructor Station functionality.

All operator-related actions normally performed in the BWRX-300 MCR identified by the training analysis will be incorporated into the simulator capability. The simulator will be based on the final iteration of the plant design and the simulator and simulation models will support the training of certified staff.

The DNNP initial certification training program is planned to begin in 2026, with the program completed and CNSC certified staff in place prior to the initial fuel load.

OPG has mature and effective programs in place for initial and continuing training in compliance with applicable regulatory requirements that will apply under the proposed construction licence.

In support of a future application for a Licence to Operate, OPG will demonstrate its capability to administer initial training for certified staff and ensure sufficient certified staff are available for the safe and reliable operation of the DNNP. This includes having sufficient trained and qualified staff available to deliver the examination and testing programs throughout the station's continued operation.

### 4.3 Operating Performance

Operating performance for the Licence to Construct application refers to the licensed activities taking place during the construction and fuel-out commissioning phases. Construction activities will be executed by the constructor with oversight from OPG. Development and execution of commissioning instructions will be completed in collaboration with contract partners.

OPG will have the primary responsibility for the safety and security of construction and commissioning activities, including the work carried out on its behalf by contractors. OPG will use its independent oversight to ensure compliance with both OPG's management system and the constructor's management system, which will meet applicable standards. The construction activities to be completed by the contract partners will leverage leading construction expertise to ensure construction is executed in a safe manner and deliver nuclear grade quality that meets or exceeds OPG expectations and regulatory requirements.

#### 4.3.1 Construction Oversight

OPG is actively engaged in the oversight of site construction to ensure project success. OPG plays a multifaceted role in ensuring quality, adherence to regulations, and effective communication with project partners and vendors. Independent quality surveillance, observations and periodic checks will be conducted to ensure work and construction activities meet the design quality standards and regulations, and to monitor work progress and deadlines. Site walkdowns are conducted periodically and as required, upon site and construction islands turnovers, prior to work commencement, after work completion, or in response to emergent issues, emergencies, or any adverse scenarios. OPG also plays a pivotal role in reviewing construction work packages, work plans and design drawings.

OPG is also responsible for Memorandums of Understanding and addendums, facilitating smooth transitions and construction islands turnovers, and ensuring clear communication and agreement terms between vendors. Additionally, OPG acts as a Single Point of Contact between regulators and the constructor Aecon, enhancing communication efficiency and work coordination.

### 4.3.2 Procedures

The BWRX-300 design philosophy of “simplicity” and “designed for constructability” enables it to be efficiently constructed and commissioned per OPG’s Construction and Quality Program Management Plan, in compliance with regulatory requirements.

#### Procurement and Receipt of Materials

Established processes and procedures will ensure equipment supplied is manufactured per the requirements of the Quality Assurance program. The level of inspection requirements during manufacturing will be prescribed considering the consequence of equipment failure (including safety considerations, operational significance, economic significance). Procurement packages consisting of commercial and technical sections will be assembled in accordance with approved procurement processes, with technical specifications established with the specific product requirements.

Components will receive an initial onsite “receipt inspection” to ensure the components are as ordered, have not been damaged, and that the components are not counterfeit, fraudulent or suspect. Ongoing maintenance, surveillance, and in-service testing of components and systems will be conducted with OPG oversight.

#### Protection of Structures, Systems, and Components

The requirements associated with maintenance of SSCs during fabrication, storage, installation, and fuel out commissioning will be documented and reviewed by contract partners. Measures will be established to protect SSC and will include controls to address environmental conditions, ensure foreign material exclusion, protection from personnel traffic, and adjacent construction activities.

Requirements for cleanliness and housekeeping, fire protection, and security against theft or vandalism will further ensure system construction quality. Additionally, specific requirements will be established for shelf life, preventative maintenance, and for maintaining cleanliness, including assurance of compatibility of cleaning methods and materials. Chemistry requirements for layup, cleaning, flushing and conditioning of piping systems and components will be established.

#### Testing

Rules and procedures will be established for testing to ensure that applicable codes and standards are met. The specifics of construction testing will be defined in the installation specifications or in the documentation provided by the major equipment suppliers and used to demonstrate that components are ready for pre-operational

testing and the introduction of energy. Process and procedures will be established to control and coordinate the turnover of work, structures, equipment and systems.

### Turnover

Turnover of SSC from one organization to another will include walkdowns to ensure that they are in the state defined in the turnover documentation. Incomplete items, exceptions and completion schedules will be identified and listed for resolution prior to final acceptance. Transfer of responsibility for the maintenance and protection of equipment will occur as per the turnover process. At all times boundaries and system status will be documented. During the construction phase, there will be intrusive and non-intrusive tests performed by contract partners for which OPG will perform oversight, such non-destructive evaluation on welds via radiography.

### Commissioning Program

Commissioning is the process during which the Structures, Systems and Components of a facility, having been constructed, are made operational and verified to be in accordance with design requirements. Lessons learned and experience from other projects, including OPG's successful Darlington Refurbishment, will be incorporated into the DNNP commissioning program. DNNP will have one commissioning program that spans testing prior to fuel load, as part of the construction license, and post fuel load as part of an operating license.;

The DNNP commissioning program will be developed in detail in the commissioning plan and associated documents. The commissioning plan will address the regulatory requirements of Part B: Commissioning of Reactor Facilities of CNSC REGDOC-2.3.1 [R-10] and will include:

- Information on the commissioning organizational structure, including roles and responsibilities;
- The administrative processes that support commissioning such as turnover from construction; system acceptance by operations and the approval to move past the current test phase to the next test phase; and
- An initial list of required safety tests to be completed for each commissioning phase.

OPG has committed to providing the DNNP Commissioning Plan in advance of the start of commissioning activities.

#### 4.4 Safety Analysis

The general nuclear safety objective, which is common within the international community, is that the plant is designed and will be operated in a manner that is protective of the public and environment.

To achieve this objective, the BWRX-300 is designed to comply with the three complementary safety objectives: Radiation Protection, Technical Safety, and Environmental Protection, as identified in CNSC REGDOC-2.5.2 [R-11]. These safety objectives are not independent; their overlap ensures completeness and adds emphasis on their intent.

##### Radiation Protection Objective

The BWRX-300 is designed to account for the Radiation Protection objective through a comprehensive identification of radiation sources and an appropriately conservative radiological source term. The safety analysis confirms that comprehensive safety features and measures are provided to prevent unplanned exposures and limit occupational exposure during plant operation, maintenance and decommissioning.

##### Technical Safety Objective

The BWRX-300 is designed to account for the Technical Safety Objective by ensuring that potential radiation doses to the public from Anticipated Operational Occurrences (AOOs) and Design Basis Accidents (DBAs) will not exceed dose acceptance criteria as per CNSC REGDOC-2.5.2. The safety analysis confirms that in the 30-day period after an AOO or DBA, doses would be less than or equal to the following dose limits:

- 0.5 mSv for any AOOs, and
- 20 mSv for any DBAs.

##### Environmental Protection Objective

The BWRX-300 is designed to account for the Environmental Protection Objective by ensuring that reasonably practical measures are taken to protect the environment during the construction and operation of the reactor facility and to mitigate the consequences of an event. The safety analysis confirms that the design includes effective provisions to limit, control, treat and monitor releases to the environment and minimize the generation of radioactive and hazardous wastes.

The safety analyses are documented in the Preliminary Safety Analysis Report (PSAR) that was submitted as part of the licence to construct application. These analyses will be updated to support a future application for an operating licence.

#### 4.4.1 Safety Strategy

The BWRX-300 is designed for international deployment and, therefore, utilizes standards published by the International Atomic Energy Agency (IAEA) in its safety methodology. The IAEA Safety Standards represent an international consensus on what measures constitute a high level of protection and safety and utilize Defence-in-Depth as the primary means of preventing accidents in a Nuclear Power Plant and mitigating the consequences of accidents if they do occur.

The concept of Defence-in-Depth involves the provision of multiple layers of defence against some undesirable outcome rather than a single, strong defensive layer. In the case of a Nuclear Power Plant, the undesirable outcome is the exposure of workers or the public to radioactivity that exceeds a safe level.

The BWRX-300 Safety Strategy relies on five Defence Lines (DLs) consistent with the IAEA Defence-in-Depth concept and the CNSC REGDOC-2.5.2, 2.4.1 and 2.4.2 requirements.

The objective of the BWRX-300 Safety Strategy is to achieve a design with a high level of safety consistent with the complementary safety objectives. The design is implemented to meet defined safety limits and margins confirmed by performing safety analyses. Results of safety analyses provide feedback regarding the design, and the process is repeated as necessary.

To achieve this, a comprehensive safety assessment is carried out throughout the BWRX-300 design process to ensure that all safety requirements on the design are met throughout all stages of the lifetime of the reactor and to confirm that the design - as delivered, built, operated, and modified - meets requirements for manufacturing and for construction. The safety assessment consists of two main parts:

- The safety analyses which are performed use two complementary methods:
  - Deterministic as per REGDOC 2.4.1 to predict response to postulated initiating events (PIEs) and to verify fulfillment of acceptance criteria; and
  - Probabilistic as per REGDOC 2.4.2 to combine the likelihood of PIEs and potential scenarios and their consequences into estimation of probabilistic safety goals, source terms and risks.



- The assessment of design principles such as the single failure criterion, effectiveness of defence in depth, integrity of multiple barriers, safety classification, protection against internal and external hazards and human factors.

The results of the safety analyses provide feedback to the BWRX-300 design which may be modified until all safety objectives and regulatory requirements are met. The scope and detail of the safety analyses increase as the design matures.

The initial safety analysis is documented in the Preliminary Safety Analysis Report that was submitted as part of the licence to construct application.

The PSAR and associated safety analyses support the following goals:

- Achieving the design intent in the as-built BWRX-300 facility.
- Demonstrating the effectiveness of defence lines
- Achieving a balanced design such that no particular design feature or an event make a disproportionate contribution to the overall risk.
- Meeting the applicable safety goals and regulatory requirements, including public dose limits.

The level of detail of the BWRX-300 design and the safety analysis are progressing in parallel and iteratively, as per guidance of CNSC REGDOC-1.1.2. As they progress further to the completion of the design phased milestones, additional information will be provided to CNSC staff.

#### 4.4.1.1 Defence-in-Depth and Plant States

To achieve a high level of safety, the BWRX-300 design is based on the concept of Defence-in-Depth to compensate for potential human and component failures, and to maintain the effectiveness of the fission product barriers.

The Defence-in-Depth provides a conceptual platform for the effective implementation of the BWRX-300 Fundamental Safety Functions (FSFs):

- Control of reactivity;
- Removal of heat from the fuel (in the reactor, during fuel storage and handling, and including long-term heat removal); and

- Confinement of radioactive materials by shielding against radiation, controlling planned radioactive releases, and limiting accidental radioactive releases.

There are five levels of Defence-in-Depth called Defence Lines (DLs):

- DL1 includes quality measures in the design taken to minimize potential for failures and for initiating events to occur (Note: DL1 does not include plant functions).
- DL2 includes functions to detect and mitigate PIEs to prevent escalation to accident conditions.
- DL3 includes plant functions that detect and mitigate design basis accident frequency PIEs and event sequences, by preventing fuel damage, when possible. Assuring the integrity of the release barriers are maintained, and the plant is maintained in a safe state until normal operations are resumed.
- DL4 is comprised of DL4a and DL4b:
  - DL4a functions detect and mitigate DECAs that occur without core damage.
  - DL4b functions detect and mitigate DECAs to prevent or mitigate the consequences of severe accidents.
- DL5 involves off-site emergency preparedness measures to protect the public in case a substantial radioactive release occurs (Note: DL5 does not include plant functions).

The safety analysis of the BWRX design evaluates and assesses the challenges to safety of all categories of plant states which are included in the plant design envelope. The BWRX-300 plant states, illustrated by Figure 19, are associated with DLs and are grouped into a limited number of categories primarily on the basis of their frequency of occurrence:

- Anticipated Operational Occurrences (AOOs): A frequency category applied to Postulated Initiating Events (PIE) or event sequences that are expected to occur (frequency greater than 1E-02 per reactor-year).
- Design Basis Accidents (DBAs): The range of conditions and events taken explicitly into account in the design of a nuclear facility, according to

established criteria, such that the facility can withstand this range without exceeding authorized limits (frequency of 1E-02 to 1E-05 per reactor-year).

- Design Extension Conditions: Beyond Design Basis Accidents (BDBAs) and represent the BDBA event sequences that are not practically eliminated (less frequent than 1E-05 per reactor-year).
- Severe Accidents (SAs): involve core damage (are also BDBAs); most of the severe accidents are practically eliminated; however, some DEC severe accidents are considered.

Operational States		Accident Conditions		
Normal Operation	AOO Event Sequences	DBA Event Sequences	DEC Event Sequences	Practically Eliminated Conditions; not within plant design envelope
Design Basis Conditions			Design Extension Conditions	
			No Core damage	Severe Accidents (core damage)
			Beyond Design Basis Conditions	
Reducing frequency of occurrence ----->				

**Figure 19: BWRX-300 Plant States**

The safety analysis of the BWRX-300 design uses both deterministic and probabilistic assessments to enable the challenges to safety in the various categories of plant states to be evaluated and assessed.

#### 4.4.1.2 Postulated Initiating Events

The design of the BWRX-300 is supported by analysis of a comprehensive set of Postulated Initiating Events (PIEs), and associated failures, such that all foreseeable events identified by either frequency or consequence are anticipated and considered in the design. They include foreseeable failures of the SSCs of the plant, as well as operating errors and possible failures arising from internal and external hazards.

The PIEs are identified based on a combination of deterministic and probabilistic assessments and engineering judgment. Deterministic assessments identify and assess foreseeable events whereas probabilistic assessments predict the frequency and potential consequence of events.

The PIEs are evaluated, categorized, and grouped during the event evaluation in the deterministic selection stage. Event sequences are allocated to three types of deterministic assessment: Baseline, Conservative and Extended. A bounding set of PIEs and event sequences, which result in the most significant challenge to the FSFs, are selected for deterministic evaluation. Both the PIEs and event sequences, which are relevant to core damage and radionuclide releases outside containment, are examined in the Probabilistic Safety Assessment (PSA).

#### 4.4.1.3 Deterministic Safety Analysis

The Deterministic Safety Analysis (DSA) is a structured review of the safety performance of the plant, including its Structures, Systems (safety and operating), and Components, and its personnel and management under a wide spectrum of postulated event sequences.

The DSA is intended to demonstrate the effectiveness of Defence-in-Depth to provide assurance that barriers to the release of radioactive material will maintain their integrity to the extent required. The DSA is also performed to demonstrate that the complementary design features are capable of coping with DECAs. Supplemented by further specific information and assessments (e.g., fabrication, testing, inspection, and operating experience) and the probabilistic assessment, the DSA contributes to demonstrating that the potential radiological consequences of different plant states are acceptable.

As described in the LTC application, the BWRX-300 DSA is performed for the Baseline, Conservative and Extended assessment categories. The primary objectives are:

- Baseline - demonstrates the effectiveness of the DL2 functions to mitigate AOOs and prevent progression to accident conditions without relying on DL3 functions. The assessment is performed to demonstrate that an event meets established acceptance criteria, including the public dose limits. The endpoint of the analysis is a controlled stable state with no damage to Structures, Systems, and Components.
- Conservative - demonstrates the effectiveness of DL3 functions without relying on any other level of defence. The assessment is performed using conservative initial plant conditions with established acceptance criteria, including the

public dose limits. The endpoint of the analysis is a controlled stable state and preservation of integrity of fission product barriers.

- Extended - assesses the effectiveness of DL4a functions for DEC to demonstrate conformance to safety goals. The endpoint of the analysis is to demonstrate achievable stable shutdown conditions for the event sequence.

Acceptance criteria are used to evaluate the capability of the BWRX-300 design to prevent a more serious plant condition following an event, and to prevent consequential loss of function of the safety systems needed to mitigate the consequences of an accident.

Acceptance criteria include:

- A set of safety limits that relates directly to the radiological consequences of operational states or accident conditions, or to the integrity of barriers.
- A set of design limits consistent with the key physical parameters for each item important to safety (preconditions for meeting the safety criteria).

Acceptance Criteria have two components: qualitative and quantitative. Qualitative acceptance criteria are defined as safety goals while quantitative acceptance criteria are based on direct physical evidence and well-understood phenomena.

The DSA of the BWRX-300 design is conducted in accordance with the requirements of CNSC REGDOC-2.4.1 [R-12]. The predicted doses meet the dose acceptance criteria for AOOs and DBAs, which are specified in CNSC REGDOC-2.5.2, and the corresponding derived acceptance criteria specified in CNSC REGDOC-2.4.1.

Compliance with these requirements shows that physical barriers are assessed to be effective in limiting the release of radioactive material and preventing unacceptable radiological releases following AOOs or DBAs. DEC events do not have specific radiological acceptance criteria (the effects of DEC events are considered in the probabilistic safety assessment).

#### 4.4.1.4 Hazard Analysis

The primary objective of the BWRX-300 hazard analysis is to identify hazards with potential challenge to one or more FSFs and to identify where PSAs are required. There are four types of hazard evaluations that are performed for the BWRX-300 design: functional failure of plant systems or equipment, external hazard evaluation, internal hazard evaluation, and erroneous decisions or human action(s) that lead to an

unplanned plant transient. Additionally, credible potential combinations of the external hazards and the potential interaction of external and internal hazards are considered.

Functional failures of plant systems or equipment with potential to cause a challenge to a FSF are considered in the Hazard Evaluation. These hazards are identified in Failure Modes and Effects Analyses (FMEAs) performed on the plant's systems as part of the design process and serve as input to the Functional Failure Hazards Evaluation (FFHE). Unlike the other three types of hazards discussed below, functional failure (i.e., equipment failures) are generally PIEs, rather than hazards that lead to PIEs. The FFHE is limited to random single failures and to common cause failures. The system FMEAs are reviewed to identify such failures that cause challenges to FSFs, and a consolidated list of such failures from all system FMEAs is generated and organized.

### External Hazards

External Hazards originate from a source that is not under control of the nuclear power plant licence holder (the hazard source is not a part of the licensed nuclear plant site). External hazards include both natural and human induced hazards. The External Hazards Evaluation addresses both individual hazard sources and combinations of sources. Examples of natural external hazards include earthquakes, droughts, floods, high winds, tornadoes, tsunami, and extreme meteorological conditions. Examples of human induced external hazards include potential release of toxic gases from adjacent facilities, aircraft crashes and ship collisions.

### Internal Hazards

Internal Hazards originate within the boundaries of the site and with potential to indirectly lead to an unplanned plant transient. The following types of internal hazards are typically considered: fires, explosions, projectiles from rotating or pressurized equipment, collapse of structures/falling objects, pipe whip, jet effects, flooding, electromagnetic interference and human operational hazards.

The internal hazard condition does not directly challenge an FSF, but the effects of the hazard may cause equipment failures that do. For example, a break in fire water piping near a plant electrical equipment room is considered an internal hazard. The broken pipe or the depletion of the fire water supply does not directly challenge an FSF; the reactor could continue operating undisturbed even if the fire water tank was empty. However, the water released into the electrical equipment room could cause short circuits or other failures of the electrical equipment. These electrical failures

could then cause a pump trip or reposition a valve that might initiate a challenge to an FSF.

The example above contrasts with a broken pipe in a system directly involved in the plant's nuclear or power generation processes. In this case, depletion of a fluid through the break may directly cause a challenge to an FSF. This sequence represents a functional failure hazard not an internal hazard.

#### Human Operation Hazards

Human Operation Hazards include failures that involve an erroneous decision or action taken by a human that can lead to an unplanned plant transient. These primarily involve erroneous decisions or actions by operators to change the state of plant equipment from a designated control location; and erroneous decisions or actions by maintenance personnel during a planned maintenance activity resulting in an unintended state-change of plant equipment. Because human hazards manifest as improper state-changes of plant equipment, many human operation hazards produce the same effects as a failure of the corresponding equipment and the effects of such failures are already included in the FFHE.

Qualitative and quantitative criteria are applied to screen out potential hazards that pose no credible adverse consequence to the safe operation. The hazard analysis considers all plant states to establish a comprehensive set of PIEs.

#### 4.4.1.5 Probabilistic Safety Assessment

The Probabilistic Safety Assessment (PSA) provides an integrated review of the plant design operational safety and complements the results of the deterministic analyses. The PSA assesses design vulnerabilities and optimizes the design using a graded approach consistent with REGDCO 2.4.2. The PSA starts with a comprehensive hazard identification and assessment and involves the identification of initiating events, strategies for prevention and mitigation measures.

The PSA is divided into two levels, depending on the scope of the analysis:

- Level 1 provides an assessment of plant design and operation and calculates the probabilities of sequences that could lead to core damage.
- Level 2 provides an assessment of core damage accidents and calculates the probabilities and magnitude of accidental radioactive releases.



The corresponding quantitative safety goals established in CNSC REGDOC-2.5.2 are:

- Core Damage Frequency (CDF): The sum of frequencies of all event sequences that can lead to significant core degradation shall be less than  $10^{-5}$  per reactor year.
- Small Release Frequency (SRF): The sum of frequencies of all event sequences that can lead to any release to the environment that requires temporary evacuation of the local population or a release to the environment of more than  $10^{15}$  becquerels of iodine-131 shall be less than  $10^{-5}$  per reactor year.
- Large Release Frequency (LRF): The sum of frequencies of all event sequences that can lead to any release to the environment that requires long-term relocation of the population or a release to the environment of more than  $10^{14}$  becquerels of cesium-137 shall be less than  $10^{-6}$  per reactor year.

The PSA results demonstrate that the BWRX-300 design meets these safety goals with significant margins. The PSA was performed in accordance with the requirements of CNSC REGDOC-2.4.2 [R-13]. The preliminary LRF estimates shown in Figure 20 demonstrate that the LRF is well bounded by the Safety Goals.

The PSA continues to evolve with design by incorporating resultant changes as well as operational insights.

PSA Events	Large Release Frequency (LRF) per year
Internal Events At-Power	1.8E-09
Internal Events Low Power and Shutdown (LPSD)	7.0E-10
Seismic Event	4.8E-08
High Wind Event	4.3E-09 (Straight Wind) 1.3E-10 (Tornado)
Internal Fire	1.3E-08
Internal Flood	5.5E-10
Spent Fuel Pool	1.3E-08
Fuel and Heavy Load Movements	5.7E-09
Fuel Pool Events	1.3E-08
<b>Safety Goal (REGDOC-2.5.2)</b>	<b>1E-06</b>

**Figure 20: DNNP BWRX-300 Preliminary PSA Results Severe Accident Analysis**

Severe Accidents (SA) represent a subset of Beyond Design Basis Accidents (BDBAs) which are less frequent than DBAs. The objective of SA analysis is to identify and characterize accidents that can lead to significant core damage and/or offsite releases of radioactive material and, if reasonably practicable, define measures to mitigate or eliminate the possibility of certain conditions arising that could lead to early or large radioactive releases.

The SA analysis of the BWRX-300 design is performed as part of the PSA and will continue to evolve commensurate with the available design information. This process is iterative and, as the project advances through the detailed design phase, the analysis will be further refined and validated to demonstrate balanced design with very low overall risk.

The SA analysis of the BWRX-300 design is performed in accordance with CNSC REGDOC-2.5.2, REGDOC-2.4.1, and REGDOC-2.4.2.

The SA analysis results will also be used in developing the accident management programs, as per the requirements of CNSC REGDOC-2.3.2 [R-14], and emergency preparedness planning for the BWRX-300 facility.

#### 4.4.1.6 Accident Management

Event mitigation is a set of actions taken during an accident to prevent the escalation of the accident, mitigate the consequences of the accident, transition into event recovery, and to achieve a long-term safe stable state after the accident. In such circumstances, engineered safety features would act to confine any radioactive material released from the core so that discharges to the environment would be minimal. These engineered safety features include physical barriers, some of which have the single purpose of confining radioactive material.

Accident management includes preplanned and ad-hoc operational practices which, in circumstances in which the design specifications of the plant are exceeded, would make optimum use of existing plant equipment to restore control.

OPG's approach to accident management is:

- Preventive accident management integrates actions and measures needed to prevent SAs from progressing to more severe conditions, including core damage. This is usually accomplished by available equipment, procedures and guidelines.
- Mitigative accident management, often referred to as severe accident management, is primarily devoted to maintaining the integrity of the containment and minimizing the release of radioactive materials.

The BWRX-300 DSA examines the event sequences for AOOs and DBAs to ensure that the credited safety functions are effective in stopping the event progression. Event mitigation is also considered in the PSA to identify potential plant vulnerabilities and design improvements to reduce the probability of severe accidents, or should an accident occur, mitigate the consequences.

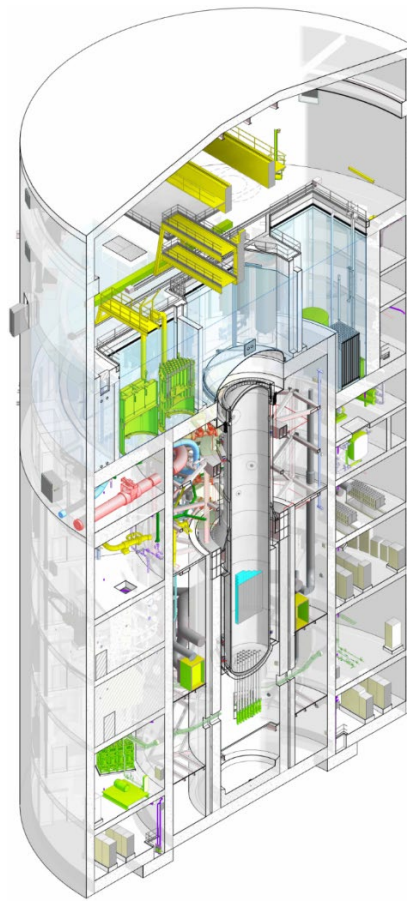
Commensurate with the current level of design coupled with preplanned and ad-hoc operational practices which would be defined as part of a future operating licence, OPG has concluded that the accident management will effectively achieve a long-term safe stable state of the BWRX-300 following an accident, as per CNSC REGDOC 2.3.2.

## 4.5 Physical Design

The LTC application includes a general description of the physical design of the BWRX-300 (a conceptual cross view of the Reactor Building is shown in Figure 21), and the design practices informed by the safety strategy and concepts. The application also includes a description of OPG's design program, management, and oversight that are implemented in accordance with the requirements of CSA N286.2 [R-15] and CNSC REGDOC-2.5.2.

As discussed in the previous section, the BWRX-300 is designed to comply with the three complementary safety objectives: Radiation Protection, Technical Safety, and Environmental Protection. The BWRX-300 design strategy is to achieve a high-level of safety, reliability and maintainability.

As detailed in the previous section, comprehensive safety assessment is carried out to evaluate the safety performance and capability of the various plant systems and components under all conditions (i.e. normal, anticipated occurrences and accidents) to demonstrate that the BWRX-300 will meet the required level of safety.



**Figure 21: Conceptual Cross-Section of Reactor Building**

#### **4.5.1 General Design Approach**

The BWRX-300 design is conducted in an iterative phased process. The initial phase starts by establishing design requirements from product, facility owner and regulations. To establish plant level requirements. These plant requirements are used to define system requirements and finally component requirements, with validation at each level to ensure that the specified requirements are satisfied in the design. This approach ensures that issues are identified and addressed early in the design. In parallel with the establishment of design requirements, a high-level conceptual design is generated and forms the basis for the iterative design process. This conceptual design is based on previous BWR design, operating experience, and research and development. Targeted deterministic and probabilistic safety evaluations are performed to provide guidance on the design and to inform the selection of requirements and design concepts.

The next phase of the design focuses on developing the specific design definition of primary structures, systems and components. Technical reviews are conducted to

confirm the adequacy of design requirements and objectives. System interfaces are established and an integrated design model and baseline DSA, and PSA are developed with consideration of plant-level requirements, interfacing systems and the overall plant operational concept.

The third phase of design concerns the effort to progress the design in preparation for construction planning, detailed component design, and support for equipment procurement required at this stage of design.

The final design phase focuses on finalization of all remaining system and component design in preparation for construction activities. The remaining equipment specifications are finalized for procurement. Updates may be needed to component specifications and datasheets based on feedback from selected vendors, and these are evaluated for application to the design.

It is important to note that the design of individual systems, and in some cases components, progress through the design phases at different paces. Design control is applied throughout the BWRX-300 engineering design process and complies with GE Hitachi Nuclear Energy Quality Assurance Program Description and GEH implementing procedures. OPG conducts intrusive oversight of the execution of the design process. This process allows some systems to progress to final design and ready for construction while others are still under design. As an example, much of the Civil Structures will be ready for construction in advance of some Instrumentation and Control Systems.

Technical reviews and design document generation are executed throughout each design phase. These technical reviews include all disciplines and, in addition to a review of the system requirements and design, also consider topics such as constructability, reliability, maintainability, and human factors.

The LTC Application, including the PSAR and other supporting documentation demonstrates that the regulatory requirements are satisfied commensurate with the stage of design and continue to be confirmed as part of the design process, some specific design and safety analysis deliverables have been committed to CNSC staff as future deliverables once the detailed design is complete. OPG will ensure that all commitments made during the LTC Application review are completed prior to the start of the relevant construction activities under a Licence to Construct.

Through iterations of both the Plant Integrated Model (including physical, hydraulic, control and electrical models) and the Analyses (consisting of Deterministic Safety Models, Probabilistic Safety analysis Models and validated against ALARA and Human Factors principles), issues such as incompatible systems are identified early in the design process.

As an example, early in the design process the models utilize conservative assumptions related to system design and are used to determine key design parameters, such as instrument setpoints. Later in the design process, the models incorporate final system design and are used to validate plant and system design. Throughout this progression, iterative human factors analyses are performed to both provide input to and review the DSA and PSA, as well as to generate analysis-based Human Factors Engineering (HFE) requirements for input to the design.

The behaviour of the BWRX-300 is analysed under a wide range of conditions that the plant must withstand without unacceptable damage. Consideration is given to accidents beyond the design basis to ensure that early or large releases will be prevented, minimized or mitigated.

This assessment provides information that forms the basis for the decision on whether the overall safety and specific aspects of the physical design are satisfactory. The design and safety assessment are thus a part of the same process which will continue until a desired design solution, meeting all relevant safety requirements, has been reached.

The facility design is based on engineering practices that are proven by testing and experience and comply with applicable codes, standards and other appropriately documented statements.

The BWRX-300 SSCs are conservatively designed, constructed, and tested to quality standards commensurate with the safety objectives. Design and operational safety margins are considered to ensure the overall safety and reliability of the plant. Approved codes and standards are used, whose sufficiency and applicability have been assessed, and which have been supplemented or modified if necessary.

#### **4.5.2 Regulatory Documents, Codes and Standards**

Regulatory documents, codes and standards were reviewed and evaluated to determine their applicability to the BWRX-300 technology. The results of this evaluation were reviewed and concurred with by CNSC staff.

Variances, such as codes and standards that differ from those used in Canada, and cases where regulatory documents, codes and standards are not met directly were identified. The safety significance of the variances was assessed to confirm that the intent of requirements are met and the overall level of safety of the BWRX-300 design is preserved.



All code variances are submitted to the CNSC staff for approval. The safety significant variances that have been identified are described below.

#### Compliance to CSA Pressure Boundary Requirements

Pressure or fluid retaining SSCs are required to comply with the requirements of CSA N285.0 [R-16] which was developed specifically for the CANDU plants. Consequently, certain elements of this standard are not directly applicable to the BWRX-300 design which is addressed through deviations and variances submitted to CNSC for approval.

OPG has submitted to the CNSC the variances for classification of pressure boundary SSCs for the BWRX-300. These variances apply to all pressure retaining systems, components and supports.

#### Compliance to CSA Requirements for Containment Structures

CSA N287.3 [R-17] permits the use of alternative design methods for the design of concrete containments in Canada. The BWRX-300 Steel-Plate Composite Containment Vessel is constructed using an advanced, innovative Diaphragm Plate Steel Composite system to facilitate modular construction. Current available codes and standards do not include specific provisions for DPSC.

The BWRX-300 containment is designed according to the specifications developed based on analytical and engineering principles and experimental test results which confirm that the design methods are conservative. Aging management requirements for the Reactor Building and DPSC are also defined. These requirements will inform the in-service inspection and testing program that will ensure the RB can fulfill its intended functions throughout its design service life.

The information in the LTC application as well as its supporting documents, submitted to CNSC, demonstrates that the BWRX-300 containment design has a level of safety and performance equivalent to that set by CSA N287.3 and meets or exceeds the relevant requirements in REGDOC-2.5.2.

### **4.5.3 Safety classification of Structures, Systems and Components**

The design principles of independence, diversity, separation, and redundancy are applied to safety systems of the BWRX-300 through the safety classification of SSCs, ensuring high reliability, reduced common cause failures and fail-safe operation, which in turn ensures that any failure places the system or component in a safe state. It also establishes a graded approach in the selection of materials, and application of

codes and standards used in design, manufacturing, construction, testing and inspection of individual SSCs.

The BWRX-300 approach to classifying SSCs is consistent with IAEA SSR-2/1 [R-18] and IAEA SSG-30, Safety Classification of Structures, Systems and Components in Nuclear Power Plants [R-19].

The BWRX-300 approach to classifying the safety class of SSCs is based primarily on deterministic methods and is directly traceable to their respective safety functions. This approach addresses:

- The consequences of the SSC's failure to perform its safety functions.
- The expected frequency of the SSC being called upon to perform its safety functions.
- The time following a postulated initial event at which, or the period for which, the SSC may be called upon to perform a safety function.

A fundamental element of the BWRX-300 SSC classification approach is the direct correlation between the DLs in which an SSC performs a function, and the relative safety importance of that function. Functions are categorized into three safety categories, Safety Category 1, Safety Category 2, and Safety Category 3, with Safety Category 1 being the most important.

Primary functions are those that directly perform the FSFs in support of DL2, DL3, DL4a, or DL4b. Safety Categories are applied to the primary functions as follows:

1. Safety Category 1 is assigned to DL3 primary functions. DL3 functions assure the integrity of the barriers to release, provide the ability to place and maintain the plant in a safe state, and provide independence and diversity for all DL2 and DL4a functions caused by a single failure (and many CCFs). Accordingly, DL3 primary functions are the most important from a safety standpoint.
2. Safety Category 2 is assigned to DL4a primary functions. Both DL2 and DL4a provide a redundant means to address PIEs (generally independent of DL3 functions) and are therefore important from a safety standpoint, although less important than DL3 functions. DL4a functions are a backup to DL3 functions, in the unlikely event a DL3 functions fails, and therefore have a higher consequence of failure than DL2 functions and are more important from a safety standpoint than DL2 functions.
3. Safety Category 3 is assigned to DL2 and DL4b primary functions as they are relatively the least important. DL4b functions address severe accidents, which

are extremely unlikely because failure of both DL3 and DL2 or DL4a functions would have to occur. Accordingly, DL4b functions are considered relatively the least important defence line functions, despite the high consequence of failure.

4. Non-Safety Category is assigned to all other functions.

Components that are required to perform multiple functions with different safety categories are assigned to a safety category based on the highest safety category of any of the functions they perform.

#### 4.5.4 Design Considerations

##### The Concept of Break Exclusion Zone (BEZ)

In accordance with REGDOC 2.5.2, all pressure retaining piping inside and outside containment in the BWRX-300 is designed to limit stresses and deformation during and after PIEs. In addition, piping is designed to minimize flaws in pressure boundary and to facilitate inspections during the entire operational life.

To address these requirements for high energy piping, the concept of the Break Exclusion Zone is applied to high and moderate energy piping penetrating containment, including a short extension up to the seismic interface restraints outside containment. This approach was originally developed to address breaks that could not be isolated in high energy piping in light water reactors.

The methodology of BEZ includes the following:

- Stress and cumulative fatigue usage factor limits are more stringent than usually required by American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III [R-20].
- Piping is fabricated and installed to higher quality requirements with the objective of minimizing the number of welds.
- The piping and welds are inspected throughout the operational life of the facility.

BEZ methodology, which is applied to all phases of design and fabrication of BWRX-300 pressure retaining piping, combined with augmented in-service inspections significantly reduces the potential for pipe breaks. This eliminates the concern of

dynamic effects from high energy line breaks in those sections of piping in containment, thus reducing the likelihood of unisolable breaks.

### Human factors

The high-level goal of the BWRX-300 Human Factors Engineering program plan is to specify a proportionate, integrated, and effective Human Factors program for all phases of the reactor lifecycle that reduces the risks and consequences influenced by human interactions, as far as reasonably achievable. The program includes all elements of planning, analyses, design guidance, job design, verification, and validation to ensure that the human factors considerations have been effectively integrated in the design process.

HFE uses a graded approach to provide the appropriate focus for analysis and design with regards to human interactions within the systems. The grading of human actions for the BWRX-300 project is based on three risk categories of nuclear safety, personnel safety, and asset protection.

HFE inputs to the design incorporate considerations for maintenance, inspection, access and egress, labels and signs, and workplace design to address the design of working areas and environments.

### Radiation Protection

The objective for BWRX-300 radiation protection is to keep radiation exposures within regulatory limits and As Low As Reasonably Achievable (ALARA), while accounting for social and economic factors.

General design considerations and methods employed to maintain in-plant radiation exposures ALARA include reducing the necessity and amount of time spent in radiation areas for personnel, reducing radiation levels in routinely occupied plant areas, and controlling contamination.

### Operating experience and safety research

The design relevant operating experience and research have been, and will be, considered during all phases of the BWRX-300 design, construction, commissioning, operation (including maintenance) and decommissioning.

In developing the BWRX-300 design, over 60 years of operational experience, testing and experimental benchmarking of functional compliance has been applied in choosing the design safety functional features.

As the Design Authority, GEH has established provisions for the incorporation of operating experience through Integrated Management Systems with oversight by OPG.

#### Industry Incident Reviews

As described in the LTC application, station blackout events have historically been the most demanding for BWRs to withstand and have usually been the dominant sequence for severe accident scenarios.

The BWRX-300 design carries forward the passive ICS and containment cooling concepts from the Economic Simplified Boiling Water Reactor (ESBWR). The systems that support FSF and plant monitoring are designed to operate for a period of 72 hours, without AC power, and without an intake structure that normally provides cooling water.

The ICS capacity is designed such that decay heat removal can be sustained for up to 7 days with no reliance on significant operator action, after which alternate water makeup sources (e.g., flexible mitigation/EME) can be used to refill the pools.

The Passive Containment Cooling System is designed to passively limit containment pressure and temperature by transferring heat to the equipment pool. The demonstration of plant safety functions during a beyond design basis external event such as an earthquake that creates these conditions is typically part of the diverse and flexible coping strategies that form the basis for compliance of regulatory requirements.

In April 2012, the Institute of Nuclear Power Operations (INPO) conducted an independent review of the Fukushima nuclear accident with the purpose of identifying operational and organizational lessons learned from the accident. The BWRX-300 incorporates lessons learned from Fukushima by designing for Design Extension Conditions.

#### Robustness against malevolent acts

The BWRX-300 design provides physical features to ensure the facility is protected against malevolent acts to prevent potential release of radioactivity or energy to the public and environment.

The BWRX-300 development includes a security by design approach from the early stages of design that uses sound engineering principles to demonstrate that within an acceptable margin of confidence sufficient capabilities are available to perform the above functions over a wide range of threats.

The details of the design relating to security systems and structures are considered Prescribed Information and as such were provided directly to CNSC Staff for review.

#### Safeguards in plant design

The facility design incorporates all necessary features to comply with Canada's obligations arising from the safeguards agreement between Canada and the IAEA.

These features have been described in the Design Information Questionnaire which was prepared by OPG and has been submitted to the IAEA through the CNSC.

#### Control of foreign material

Foreign material refers to any objects that are not intended to be present within a system. These objects can be introduced from different sources such as maintenance activities (e.g., tools and materials) or component degradation (e.g., failure of a sub-component such as a gasket that is then spread throughout a system).

The BWRX-300 design will provide for the detection, exclusion, and removal of foreign material and corrosion products that may cause component or system damage or may have an impact on safety. Foreign material will be controlled by measures such as filters and strainers at designated locations and identified via instrumentation to detect changes in system pressure and flow.

#### Design for reliability

Designing for reliability has been incorporated into the BWRX-300 design in consideration of:

- Reliability assessment methods;
- Design principles and features supporting reliability;
- Common cause failures;
- Single failure criterion;
- Fail-safe design;
- Allowance for equipment outages;
- Shared systems; and
- Aging-related considerations.

The BWRX-300 Reliability Program is used to ensure that all systems important to safety function reliably and in accordance with design and performance criteria.

Through application of this program, OPG assures compliance with applicable requirements of CNSC REGDOC-1.1.2, REGDOC-2.5.2 and REGDOC-2.6.1 [R-21].

#### Equipment Qualification

Equipment Qualification requirements applied to the BWRX-300 consider all operating and accident conditions in which the safety related SSCs are expected to operate in accordance with the equipment classification. This includes conditions arising from maintenance, testing and internal and external hazards.

The objective of the Equipment Qualification program is to assure that all applicable SSCs, equipment and protective barriers are qualified to perform their safety functions under the environmental conditions defined by design basis accidents.

#### Seismic Qualification

The design of the BWRX-300 facility protects building structures and the SSCs of the facility from earthquake damage. The seismic qualification also includes the determination of seismic categories of SSCs by safety classifications and the associated methodologies, tests and analyses.

#### Climate Change

The design of the DNNP facility must be resilient against projected changes in climate that are caused by anthropogenic greenhouse gas emissions and large-scale transformation of land use. Extreme weather events are a focus in the nuclear industry, and as such, understanding how climate change will impact these events is important. Beyond the immediate business needs that drive climate resiliency, external regulatory drivers, project regulatory commitments and internal governance drivers also provide expectations on how climate change should be considered.

One of the project commitments is to perform a systematic climate change risk assessment of the proposed DNNP facility. This work is being completed over two phases, referred to as Phase 1 and Phase 2. In Phase 1 of its assessment, climate change hazards, bounding values, and potentially vulnerable Structures, Systems and Components were identified. OPG completed the Phase 1 scope of work and submitted it to CNSC. Phase 2 of the assessment takes the list of potentially vulnerable SSCs from Phase 1 and develops risk treatments. These risk treatments may include adaptive action where design changes are made. They may also include monitoring plans for instances where immediate adaptive action is not justified.



### Operability and maintainability

Operability is a primary consideration in the BWRX-300 safety analysis and design. It provides insights for establishing design criteria and Operating Limits and Conditions (OLCs) that meet applicable codes, standards and regulatory requirements to ensure the ongoing operability of safety critical systems for different plant states.

Maintainability is built into the BWRX-300 design by defining primary requirements for in-service monitoring, tests, maintenance, repairs and inspections to ensure they have been followed. These requirements include accessibility, ALARA, aging management, testing and maintenance.

### Operating Limits and Conditions

A set of operational limits and conditions is defined to identify safe boundaries for plant operation. Minimum requirements are also set for the availability of staff and equipment.

Operating Envelope and OLCs ensure compliance with the safety analysis. OLCs include safety analysis and safe operating limits, conditions of operability, actions and action times, and surveillance requirements. This approach is consistent with the relevant requirements in CNSC REGDOC-2.5.2.

## **4.5.5 Design Management**

Design development, technical reviews, design changes and configuration control are executed throughout each design phase, providing a high level of confidence that all relevant safety requirements are met. The design approach includes:

- Comprehensive, collaborative, and iterative design process;
- Conformity to the design basis throughout construction and commissioning;
- Rigorous procedures and requirements;
- Documented and controlled processes and tools;
- Effective change control and configuration management; and
- Evolutionary development process.

In addition, the BWRX-300 design, construction, commissioning and operation are routinely assessed from the perspective of prevailing modern standards and international practice to achieve the highest level of safety as reasonably practicable.

GEH will maintain the Design Authority for the BWRX-300 up to plant start-up. OPG will be an informed customer, providing owner oversight and operator inputs. OPG's role includes reviews and acceptance of design deliverables as well as surveillance and witnessing of engineering activities performed by GEH and the other contract partners in accordance with their respective management systems. This ensures that engineering design deliverables and other work by the contract partners meet all applicable requirements and specifications throughout procurement, construction and commissioning phases, and there is early detection of potential issues so that corrective measures can be taken at the appropriate time.

OPG also ensures that GEH meets the design objective and requirements of CNSC REGDOC-2.5.2 using a graded approach to the design, procurement, construction and commissioning phases. A turnover strategy will describe the transition of the Design Authority to OPG that will occur prior to start up.

#### 4.5.5.1 Design Changes and Configuration Control

The physical design of the BWRX-300 continues to progress following a systematic iterative process using safety analyses to inform the design as it progresses to detailed design. The BWRX-300 design configuration will be maintained throughout the entire plant lifecycle by programmatic configuration and change control processes overseen by the Design Authority. Throughout this process, OPG will act as an informed customer to ensure that design changes are adequately controlled.

Regardless of the scope, all changes that impact the BWRX-300 design basis and/or safety analysis are managed, tracked, and communicated to the CNSC on a quarterly basis. The changes are controlled through the rigorous engineering change control and review process and only authorized once the total impact is considered.

## 4.6 Fitness for Service

Fitness for Service covers the activities that impact the physical condition of SSC to ensure that they will remain available, reliable, effective and consistent with design, analysis and quality control measures throughout the life of facility. This is accomplished by implementation of processes that establish SSC requirements and practices in the following areas:

- Reliability;
- Maintenance;
- Aging Management;
- Chemistry Control; and
- Periodic and In-Service Inspection.

These areas are addressed through compliance with the applicable laws, regulations, codes and standards. Fitness for Service considerations are incorporated into design as described in section 4.5. The details for the Fitness for Service governance covering these areas during operation will be addressed as part of a future operating licence application.

## **4.7 Radiation Protection**

### **4.7.1 Radiation Protection during the Construction Phase**

The proposed licenced activities do not include the possession and use of nuclear substances, so construction activities covered by this licence are not expected to result in radiation doses to workers or the public. The radiation doses to DNNP workers from the Darlington Nuclear Generating Station and the Darlington Waste Management Facility continue to be well below the regulatory dose limit for members of the public as confirmed by the monitoring programs established for their respective licences.

Radioactive sources, such as those used by contract companies in nuclear gauges and exposure devices, may be required at the DNNP site during the construction phase. These are licensed separately by the CNSC and used in accordance with the respective licensee's CNSC-approved radiation protection program to ensure the safety of workers and the public.

### **4.7.2 Radiation Protection in the BWRX-300 Design**

The BWRX-300 design strategy is intended to ensure that radiation doses are kept below the regulatory limits and ALARA taking into account social and economic factors. ALARA principles are being incorporated into the design based on the regulatory requirements, industry standards and operating experience.

Examples of ALARA design considerations include reducing the amount of personnel time required in radiation areas (e.g. remote operations of plant equipment) and reducing radiation levels in routinely occupied plant areas (e.g. efficient removal of radioactivity from the reactor coolant using filters and demineralizers).

Some of the radiation sources found at other BWRs, such as reactor vessel recirculation pumps, are not present in the relatively simple and passive BWRX-300 design, which is expected to result in less occupational dose during operations and maintenance.

Preliminary radiation zones based on anticipated occupancy times and dose rates during full power operation and shutdown conditions have been established for the BWRX-300 plant layout. These design dose rates have been estimated based on operating experience and are being used as a comparison for the shielding design calculations and to estimate collective occupational exposures.

#### 4.7.3 The Operational Radiation Protection Program

The future radiation protection program for DNNP will provide the necessary oversight and control to ensure occupational and public exposure to radiation during operations remains ALARA, taking into account social and economic factors. Per regulatory requirements, the radiation protection program will also include a set of action levels for radiation doses or other parameters that, if reached, may indicate a loss of control of part of the program and trigger a requirement for specific action to be taken.

The following will be included in the future radiation protection program for DNNP:

- Management control over work practices;
- Personnel qualification and training;
- Control of occupational and public exposure to radiation;
- Planning for unusual situations;
- Organization and administration for radiation protection
- Radiation protection training and qualification
- Classification of radiation zones
- Radiation exposure and dose control
- Worker dose management
- Radiation protection equipment and instrumentation
- Contamination control
- Radiation protection program oversight
- Dose to the public

#### 4.7.4 Projected BWRX-300 Occupational Exposures

Based on the BWRX-300 conceptual design, the annual collective occupational dose during the operations phase is estimated to be approximately 490 person-mSv. This estimate is less than the 1 person-Sv annual collective dose target OPG established for this reactor, due to the design features that support the ALARA principle. It is also

relatively low compared to typical annual collective doses at currently operating BWRs and is expected to be further reduced as additional design details are confirmed. Individual doses will be maintained below the regulatory dose limits for Nuclear Energy Workers and will be estimated prior to the operations phase when information such as anticipated staffing levels is established.

#### 4.8 Conventional Health and Safety

OPG applies a rigorous and effective safety management system to protect personnel by managing workplace health and safety and the non-radiological hazards within the workplace.

Under OPG's Health and Safety Management System, workers are expected to adhere to all applicable health and safety legislation and relevant regulations. Additionally, under safety training standards, the Health and Safety Management System incorporates provisions that necessitate contractors to meet all prescribed safety training standards, including those outlined in Occupational Health and Safety Awareness and Training (O. Reg. 297/13). These measures underscore OPG's commitment to ensuring a safe and compliant working environment.

While OPG will maintain overall responsibility for safety under the proposed licence, the lead contractor for construction will assume the role of constructor under the Occupational Health and Safety Act (OHSA) [R-22].

OPG will enable the constructor to determine the means, methods and procedures for project execution, while outlining necessary requirements in the contract specifications. OPG will provide oversight to ensure that the project complies with legislative and regulatory standards. OPG and contractors will manage the health and safety of workers associated with the DNNP as per the DNNP health and safety plan.

The constructor will have a risk management process in place to identify, assess and control associated risks. The constructor is required to have their own Corrective Action Program which will be used to correct adverse conditions and to manage risks effectively. The constructor's management team will provide sufficient oversight to confirm that their corrective action program is rigorously followed. Problems will be identified, documented, and evaluated/corrected based on significance with measures in place to prevent re-occurrence.

OPG, as the owner, will perform field assessments during the contract execution to confirm compliance with contractual terms, conditions and the constructor's project-specific plans. OPG will document and communicate any non-conformance observed to the constructor.

Safety event reporting requirements have been established and communicated to the Constructor. Safety events and non-conformances meeting the defined thresholds will be reported to the CNSC as per CNSC REGDOC 3.1.1 [R-23].



## 4.9 Environmental Protection

OPG has a robust and mature environmental protection program in place for the DN site to ensure effective oversight and control to minimize environmental releases and promote continued protection of the environment while meeting all regulatory requirements.

The construction activities under the proposed DNNP licence that present potential environmental hazards include heavy equipment operations and groundworks, construction of the water intake/discharge structure for the CWS, construction of shoreline protection, construction of the reactor embedment and management of hazardous wastes. The monitoring and evaluation of environmental parameters such as dust, noise and groundwater impacts and the implementation of mitigation measures and beneficial actions help ensure the protection of terrestrial and aquatic species and their habitat.

The proposed licenced activities do not include the possession and use of nuclear substances, so construction activities covered by this licence are not expected to result in any radiological risks to the environment.

OPG has an established Environmental Management System (EMS), which is certified to the International Organization for Standardization (ISO) 14001 Environmental Management System Standard [R-24] and implements the requirements of OPG's Environmental Policy.

The Environmental Policy states that OPG shall meet compliance obligations, including any environmental commitments that it makes, with the objective of exceeding these compliance obligations where it makes business sense.

The EMS uses a risk-based approach to identify and assess areas of concern with respect to environmental management and ensures that activities are conducted in a manner that prevents or mitigates adverse environmental effects.

DNNP construction phase activities will be executed in a manner that conforms to the requirements of the Environmental Policy and the EMS, by way of the following:

- The Environmental Management and Protection Plan (EMPP);
- The Site-Specific Environmental Management Plan (SSEMP); and
- The Environmental Monitoring and Environmental Assessment Follow-Up (EMEAF) Plan (discussed in the next section).

#### 4.9.1 Environmental Management and Protection Plan & Site-Specific Environmental Management Plan

The EMPP is OPG's overarching plan that implements control measures to eliminate, manage, reduce or mitigate risk associated with DNNP construction. The constructor and subcontractors are required to have site-specific environmental procedures that align with the EMPP. These site-specific procedures will be reviewed on a regular basis and updated, as necessary.

The SSEMP is consistent with the EMPP and is a living document that will be updated to reflect the requirements of the various project phases and activities. Its specific goals are to identify and document environmental risks and appropriate measures for each project activity, including management of noise and dust, spills and hazardous waste; provide direction to project personnel regarding environmental protection measures; provide references to applicable legislation, approvals and guidelines; provide a consolidated reference document for planning and conducting specific work activities or working in specific areas of concern; and communicate any changes to protection measures through a documented revision process.

Topics addressed by the EMPP and SSEMP are shown below with details included in individual site-specific plans.

- Soil management
- Spill management
- Terrestrial, aquatic and wildlife habitat protection
- Air quality, noise and dust control emissions management
- Erosion, sedimentation and surface water control
- Water and effluent management
- Archaeology and cultural heritage management

Some of the key elements of the EMPP and the SSEMP that are relevant to construction are highlighted below.

##### Spill Management

The constructor's site-specific Spill Management Plan, which aligns with applicable elements of OPG's Spill Management standard, demonstrates the constructor's

commitment to spill prevention, preparedness, response, reporting and clean-up in accordance with current standards and regulations.

### Terrestrial, Aquatic and Wildlife Habitat Protection

OPG has conducted annual biodiversity monitoring at the DN site for over 20 years and has established a database of natural heritage information. Through this monitoring, the species at risk on site are well understood.

Additionally, OPG has been undertaking studies with respect to hydrology, hydrogeology, noise/dust, and vibration to ensure species at risk will be protected during construction activities.

### Bank Swallows

In 2014 and 2017, the Bank Swallow became listed as threatened under the provincial Endangered Species Act (ESA) and the federal Species at Risk Act (SARA), respectively. Both the bird and its habitat are protected under the ESA and SARA.

OPG is making every effort to minimize the effects of construction activities on Bank Swallows. This includes undertaking mitigation measures and beneficial actions that will be captured in an ESA permit for construction. The ESA permit for site preparation activities includes the mitigation measures and beneficial actions listed below. It is anticipated that similar items will be included in the ESA permit for construction.

- Creating woodland, meadow and/or wetland habitat within a specified timeframe;
- Providing species awareness training materials to employees and contractors involved in the completion of site works by a Qualified Professional;
- Conducting vegetation disturbance and removal outside of the active season;
- Undertaking sediment and erosion control measures to prevent the migration of sediment into retained habitats;
- Directing construction lighting down and away from retained habitats.
- Controlling dust to minimize dust emissions;
- Implementing noise abatement strategies;

- Following a spill response plan to avoid or minimize the release of deleterious substances;
- Preventing Bank Swallows from establishing new nests or nesting habitat in stockpiles of soil, overburden, or similar materials; and
- Conducting research and public education.

OPG has also made strides in piloting the design and construction of an artificial nesting habitat structure for Bank Swallows, called a Fixed Face Earthen Embankment (FFEE). The FFEE was constructed at the Pickering Nuclear site in 2021 with the necessary permits to test the structure. Monitoring of the FFEE for Bank Swallow activity commenced in spring 2021. In 2023 and in 2024 the Bank Swallows were observed nesting in the structure. Monitoring of this pilot structure will continue through to 2027.

In addition to the above, OPG coordinates and participates in the Ontario Bank Swallow Working Group, which consists of researchers from Birds Canada, Environment and Climate Change Canada (ECCC), Ministry of Natural Resources and Forestry (MNRF), Ministry of Environment, Conservation and Parks (MECP), Western University, Nature Canada, and other non-governmental organizations. Most recently, the working group also included participation from representatives of the Williams Treaties First Nations.

### Bats

OPG has carried out extensive bat monitoring since the completion of the Environmental Impact Statement (EIS), and these surveys have documented eight species of bats on the DNNP site where habitats are being used for roosting and foraging activities. These species include Big Brown Bat, Silver-haired Bat, Hoary Bat, Eastern Red Bat, Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, and Tri-coloured Bat.

Three of these species are listed as endangered both provincially through the ESA and federally through SARA (Little Brown Myotis, Northern Myotis, and Tri-coloured Bat). Eastern Small-footed Myotis is listed as endangered provincially, but not federally.

OPG is making every effort to minimize the effects of construction activities on bats and their habitat. An ESA permit for site preparation activities incorporates mitigation measures and beneficial actions, many of which are the same as those listed above for Bank Swallows. Additionally, OPG's plans for beneficial actions for bats include woodland habitat creation and the installation of bat boxes.

The ESA permit application for construction is underway.

### Fish

OPG is committed to monitoring for and mitigating adverse effects on fish during construction activities. The loss of nearshore aquatic habitat and biota is anticipated during such activities as in-water work for shoreline protection, and the construction of the intake and discharge structures. However, the nearshore habitat is distinctive as the high energy, unstable environments, with wind and wave action tend to limit species diversity.

Nevertheless, the DNNP construction activities will be conducted in accordance with the conditions of a Department of Fisheries and Oceans Canada (DFO) Fisheries Authorization and associated Fish Habitat Compensation Plan, particularly when undertaking activities that may negatively impact fish or their habitat.

OPG is actively engaging with the Williams Treaties First Nations in the development of the compensation plan, as well as the design of the intake and discharge structures.

### Waste Management

The site-specific Hazardous Materials and Waste Management Plan is a deliverable required in advance of construction activities and highlights the management and mitigation measures for nonhazardous and hazardous materials related to the DNNP. This will ensure that the generation, storage, handling, and disposal of these materials is performed in an environmentally safe manner, meeting all applicable regulations.

A key component of the Hazardous Materials and Waste Management Plan will be a Hazardous Materials Inventory, which will include such information as chemical name, system/component, purpose, storage, disposal, inventory, form, and characteristics.

## **4.9.2 Assessment and Monitoring**

OPG has a robust environmental protection program in place for the Darlington site that meets or exceeds all applicable regulatory requirements. The key monitoring programs that support environmental protection are the DNNP Environmental Monitoring and Environmental Assessment Follow-up (EMEAF) program, Environmental Monitoring Program and Effluent Monitoring Program, and Environmental Risk Assessments.

Together, these programs verify that releases to air, surface water, groundwater and soils from normal operation and waste management activities meet all regulatory, federal and provincial guidelines. Each of these programs has its own scope and objectives, but they are complimentary, in that the programs provide data that is useful for planning and implementing the long-term requirements of the EMS.

Where appropriate, environmental monitoring will be performed such that data can be shared to meet the collective requirements of all licensed activities on the Darlington Site. Monitoring in this way will consider the cumulative effects of all activities/operations within the Darlington site on the local environment. For other objectives, DNNP-specific monitoring will be conducted. The various monitoring programs are outlined in the following sections.

#### Environmental Assessment Follow-up Program

Environmental monitoring during DNNP construction is established through the EA follow-up program. The follow-up program will verify the predictions made in the EIS, confirm the effectiveness of mitigation measures, and provide assurance that the applicable guidelines and regulatory criteria are being met. The program's scope was further refined through the involvement of stakeholders and Indigenous Nations and Communities. Adaptive management will be applied throughout the construction phase to allow for continuous improvement of environmental management practices by applying gained knowledge to subsequent actions.

The EMEAF Plan documents the overall objectives of the EA follow-up program, the implementation framework, and the environmental monitoring components, and also discusses high-level scoping. The environmental components are consistent with those identified in the EIS: the atmospheric environment, surface water environment, aquatic environment, terrestrial environment, geological and hydrogeological environment, land use, traffic and transportation environment, and health of human and non-human biota.

As previously stated, the proposed activities under the construction licence do not include the possession and use of nuclear substances, and therefore will not result in any radiological releases. However, the Darlington Environmental Monitoring Program (EMP) will continue to monitor for radiation and radioactivity at the DN site.

Monitoring plans and methodology reports to support the follow-up program provide a detailed description of the objectives and rationale for the monitoring activities. Where relevant, the environmental media to be sampled, the parameters to be monitored, assessment criteria, sampling and analytical methods, sampling and analytical frequency, sampling locations, requirements for the calibration of equipment, and analytical detection limits are also included in the plans.

The DNNP EA follow-up monitoring activities will be conducted as supplementary studies to the Darlington site EMP. Groundwater monitoring will be compliant with CSA N288.7[R-25].

### Environmental Monitoring Program

OPG maintains an Environmental Monitoring Program for the entire DN site that complies with CSA N288.4[R-26]. The EMP encompasses protection of both the public and the environment from nuclear substances, hazardous substances, and physical stressors resulting from operation of the DN site. The program monitors off-site air, water, aquatic samples, and terrestrial samples. Data gathered from this program is used to assess the annual radiological dose to members of the public living or working in the vicinity of the DN site.

DNNP EA follow-up monitoring activities will be conducted as supplementary studies to the Darlington site EMP, and therefore, will be subject to its requirements (CSA N288.4). Prior to operation of the DNNP, OPG will review and implement any necessary changes to the EMP to encompass environmental monitoring for DNNP operations. EA follow-up monitoring activities will either be closed off, if the objectives have been met, or integrated into the routine EMP.

### Effluent Monitoring Program

OPG's Effluent Monitoring Program complies with CSA N288.5 [R-27] and establishes requirements for monitoring nuclear and hazardous substances in airborne and waterborne effluents. This program will be applied during the construction phase of the project.

The Effluent Monitoring Plan describes specific procedures for sampling and use of accredited laboratories as per CSA N288.5. In addition, also per CSA N288.5, OPG ensures that appropriate training and required certifications are in place for those specialists and contractors supporting implementation of this program. All aspects of effluent monitoring are subject to an appropriate Quality Assurance/Quality Control program. Audits of the core elements of the program are undertaken on a routine basis.

During construction phase, effluents and emissions will be limited to non-radiological discharges (stormwater runoff, dewatering, blasting, construction equipment, fuel-out commissioning, etc.). The management/monitoring of such releases will be addressed through the EMPP, EMEAF, and the Environmental Compliance Approvals (ECAs).

The DNNP will not produce any radiological releases during construction phase activities, and as such, DNNP-specific radiological release limits and action levels will not apply.

### Environmental Risk Assessment

OPG conducts routine Environmental Risk Assessments (ERAs) in accordance with the requirements of CSA N288.6[R-28] and CNSC REGDOC-2.9.1 [R-29]. The ERA informs the EMP and the Effluent Monitoring Program.

The most recent ERA for the DN site was issued in 2021, revised in 2022, and encompassed DNNP lands and associated environmental data. The ERA consisted of a Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (EcoRA) and concluded that the site is being operated in a manner that is protective of human and ecological receptors in the surrounding area.

OPG is conducting a Predictive Environmental Risk Assessment (PERA) for DNNP that will encompass the site preparation, construction, and operation phases of the Project. The PERA will be compliant with CSA N288.6 and REGDOC-2.9.1; will use the most recent ERA data; will include both an HHRA and an EcoRA; and will utilize the predicted releases to air and water during operations of the DNNP. Engagement with the Williams Treaties First Nations is being undertaken as part of the PERA development, particularly with respect to the refinement of receptors.



## 4.10 Emergency Management and Fire Protection

OPG has an effective emergency management program that meets or exceeds all applicable federal regulatory requirements and related objectives as well as all provincial emergency response plans. Emergency management ensures that response capabilities are in place at OPG to prevent and mitigate the effects of nuclear and hazardous substances releases, both on-site and off-site to protect workers, the public and the environment.

As there is no nuclear fuel on site during the construction and fuel-out commissioning phase, there is no possibility for a radiological emergency originating from the DNNP site, so potential emergencies and their required response will be the same as for other construction sites, with the exception of potential radiological emergencies originating at the operating DNGS. As stated in Section 4.8, while OPG will maintain overall responsibility for safety under the proposed licence, the lead contractor for construction will assume the role of constructor under the Occupational Health and Safety Act (OHSA) and oversee the emergency response on the DNNP site. The contract partner has prepared an emergency response plan which was reviewed by OPG. This emergency response plan includes worksite evacuation procedures, nearest regional emergency services and crisis management contact lists.

The emergency response to any radiological emergencies originating at the operating Darlington Nuclear Generating Station (DNGS) will be under the command and control of DNGS. This includes communicating and directing DNNP site management and workers in responding to radiological risks resulting from DNGS. As part of OPG's Emergency Preparedness Drills and Exercises procedure, emergency and site evacuation drills may be held across either or both the DNGS and DNNP site.

In preparation for a future operating licence application, OPG is providing the requested information to the Province of Ontario in support of the planned revision to the Provincial Nuclear Emergency Response Plan which will reflect appropriate emergency planning requirements for DNNP and future growth in the nuclear industry.

### 4.10.1 Fire Protection Program

Fire protection during construction is conventional in nature and will be governed by the constructor under the broader conventional health and safety plan as described in Section 4.8. Clarington Emergency Fire Services will be the primary responders as reflected in the current Memorandum of Understanding between OPG and the Municipality of Clarington.

OPG will use Fire Protection Assessments to ensure fire protection goals of CSA N293[R-30] are met through physical design, administrative controls and preventative practices for all operating modes including unit start-ups and outages. In support of a future operating licence, OPG will complete a Fire Response Needs Analysis to determine the fire response requirement and the extent of Clarington Emergency Fire Services support required once the reactor is operational.

#### **4.11 Waste Management**

Similar to the DNNP PRSL, the activities to be licensed under the DNNP LTC will not involve the generation of radioactive wastes. The handling of radioactive wastes is not a licensed activity under this application. However, information is provided for how these wastes will be managed and stored through the lifecycle of the BWRX-300 at the DNNP site.

OPG has a mature and effective waste management program that meets all applicable regulatory requirements and related objectives. These programs are fully developed, implemented and audited to control and minimize the volume of nuclear and hazardous wastes generated by licensed activities.

For the DNNP, OPG will have a similar program to ensure that spent fuel, low and intermediate level radioactive waste and non-radioactive hazardous substances and waste are handled, processed, transported and stored in accordance with the applicable federal, provincial and municipal regulations and authorizations. Waste generated will be minimized through application of the 3Rs – Reduce, Reuse, Recycle.

##### **4.11.1 Soils, Wastes and Hazardous Substances**

Hazardous substances that may be present and/or hazardous wastes generated as a result of construction activities will be limited to those employed during standard construction processes. These will include chemicals, fuel, lubricants and compressed gases used during operation and maintenance of construction equipment, as well as solvents and cleaners used to clean the equipment. Additional substances on-site may consist of paint, aerosol cans, oil, batteries and electrical components used in the construction of the facility.

DNNP construction activities may generate surplus soil that will require management or proper placement and/or disposal. Surplus soils will be handled in accordance with the requirements of the DNNP SSEMPP. During construction, non-nuclear hazardous substances and waste will be managed through site-specific environmental protection plans/procedures.

#### 4.11.2 Radioactive Waste

The activities to be licensed under the DNNP LTC will not involve the handling of radioactive materials and will not generate any radioactive wastes.

The BWRX-300 will produce waste from its normal operations and maintenance activities, as well as from planned and unplanned outages. The waste will be classified as either radiological or conventional based on the radiological zone where it originated from and from radiological measurements, to make sure that waste is handled safely.

##### Interim Storage

With respect to the storage of radioactive waste generated under the operating licence, OPG has carefully considered the two options for the interim storage of low and intermediate level waste (L&ILW) that were assessed in and remain bounded by the EA: the construction of onsite licensed storage structures, and off-site transportation to a licensed facility. Subject to further necessary regulatory authorizations from the Commission, OPG intends to proceed with interim storage of L&ILW onsite at a licensed facility, followed by relocation to permanent offsite licensed L&ILW disposal facilities. OPG will continue to engage with Indigenous Nations and Communities and stakeholders with respect to the management of L&ILW and used fuel.

For the management of used fuel, OPG will utilize a similar process that is used at the existing Pickering and Darlington Nuclear Generating Stations which process is also used in the nuclear industry as the preferred method for safe and economical storage of used fuel. In addition to OPG there are other dry storage facilities in operation in Canada. There are facilities located at Atomic Energy of Canada Limited's (AECL's) Douglas Point Generating Station on the Bruce Nuclear Power Development (BNPD) site, Hydro Quebec's Gentilly Nuclear Power Plant, and New Brunswick Power's Point Lepreau NGS. The used fuel from all reactors in Ontario is currently stored in Spent Fuel Bays and dry storage facilities at the stations where the fuel was used.

When removed from the reactor, used fuel is transferred to a water-filled fuel pool (alternatively known as a Spent Fuel Bay) where it is contained to cool for a period of several years. Following the period of wet storage in the used fuel pool, the used fuel is transferred to dry storage containers and placed into appropriate facilities.

The dry fuel storage practices will reflect the fundamental safety aspects related to criticality, radiation exposure, heat control, containment and retrievability. Namely, the systems are designed and operated to assure subcriticality, control radiation exposure, assure heat removal, assure containment and allow retrievability.

### Permanent Disposal

The Nuclear Waste Management Organization (NWMO), in accordance with the federal Nuclear Waste Act (2002), is responsible for implementing Canada's plan for the safe, long-term management of spent nuclear fuel – including that created using new or emerging technologies such as SMRs. NWMO is seeking to develop a Deep Geological Repository for the permanent disposal of spent fuel, including from new nuclear and Small Modular Reactors, through its Adaptive Phased Management (APM) approach. Canada's plan has always been adaptive so that flexibility is built into repository design to accommodate changes in technology. As of October 2023, the NWMO is also responsible for developing a consent-based siting process for a DGR for intermediate-level and non-fuel high-level radioactive waste.

The NWMO Deep Geological Repository (DGR) can accommodate the long-term storage of the BWRX-300 spent fuel and this small increase in volume. As a contingency, depending on communities' interests or if additional capacity is needed in the future, NWMO is also exploring the potential to include any future used fuel from SMRs and new nuclear in the same repository that will manage the intermediate-level waste and non-fuel high-level waste. While the GEH BWRX-300 fuel is new for Canada, it has been in use internationally for over 15 years, including in several countries with advanced DGR planning for spent fuel (e.g., Finland, Sweden, and Switzerland). The NWMO has stated that it aims to identify a single preferred location for the DGR in 2024, with the facility in service in the mid-2040s, following an extensive regulatory review process and construction of the facility. For the eventual transportation of spent fuel to a future DGR, the NWMO has prepared a preliminary transportation plan and a planning framework (both released in 2021) based upon the priorities, questions and concerns heard from Canadians and Indigenous peoples.

OPG is committed to developing lasting solutions for the permanent disposal of L&ILW radioactive materials from OPG-owned nuclear generating stations and supports Canada's Integrated Strategy for Radioactive Waste (ISRW). The ISRW was developed by the NWMO per the request from Natural Resources Canada and the recommendations for the strategy were endorsed by the Minister of Energy and Natural Resources in October 2023.

Per the ISRW, low level waste will be disposed in near surface disposal facilities, and it will be the responsibility of OPG as the waste generator and owner to develop such a facility for its waste. For intermediate-level and non-fuel high level waste, the ISRW determined that a deep geologic repository is appropriate for disposal, and the NWMO is currently implementing a consent-based siting process to select the facility location. Engagement and planning for both facilities are currently in the initial stages.

#### 4.11.3 Decommissioning Practices

The Nuclear Sustainability division of OPG is responsible for planning, preparing, completing and funding decommissioning for the current and future fleet of OPG's nuclear generating stations such as the DNNP. The planning for the future decommissioning of the DNNP is conducted in accordance with OPG's Decommissioning Program which ensures the protection of health, safety, security and the environment is planned and optimized during decommissioning, as well as the waste generated from decommissioning activities are minimized and managed sustainably.

A Preliminary Decommissioning Plan (PDP) has been developed at each licensing phase of the project and will continue to be progressively updated over the life of the project. In general, the PDP defines the areas to be decommissioned and the sequence of the principal decommissioning work; the selected decommissioning strategy; main decontamination, dismantling and/or clean-up activities; end-state objectives; an overview of the principal hazards and protection strategies (including surveys and continuous environmental monitoring, etc.); a waste management strategy; a cost estimate; and financial guarantee arrangements.

For the Site Preparation licensing phase, the Site Preparation PDP was submitted to the CNSC in 2021. For the LTC phase, an As-Built PDP was submitted to the CNSC. It addresses the decommissioning activities that would need to be completed in the event the project is cancelled during or after completion of construction (prior to operations). This As-Built PDP for Construction phase will supersede the Site Preparation PDP when the construction licence is granted. In addition, an End-of-Life PDP was also submitted as part of the LTC application to demonstrate decommissioning of DNNP facility is technically feasible with existing technology. After dismantling and site restoration, the reactor site will be restored to brownfield status suitable for industrial re-use, and OPG will retain ownership of the lands.

Both the As-Built and End-of Life PDPs had been prepared to the requirements of the CNSC REGDOC-2.11.2 [R-31], REGDOC-3.3.1 [R-32], and CSA N294-19 [R-33].

The PDPs will be progressively updated, where needed, to reflect the appropriate level of detail required for the licensed activities.

## 4.12 Security

OPG has a mature and robust security program in place at the DN site. Details of OPG's Darlington security program are fully described in the DNGS Security Report submitted to the CNSC.

The OPG Security Program supports OPG's need to manage residual risk to the public created by the operation of its facilities, protect assets and respond to emergencies that may impact operations and the public. Key elements of this program include maintaining compliance with legislative requirements, while minimizing the adverse impact on staff and operations. The objective of the program is to establish a state of security readiness to ensure safe and secure operation of OPG stations and facilities.

Elements of OPG's security program for the DNNP are being revised in a phased approach, as required to address risk and regulatory requirements associated with the DNNP. The revisions reflect the stages of the project lifecycle from site preparation, through to construction, operation, and ultimately decommissioning.

The activities authorized under the Licence to Prepare Site for DNNP have limited nuclear security impact. The security program for the DNNP during the site preparation phase is focused primarily on ensuring that the site remains suitable for a new nuclear development from a security perspective, mitigating risk to existing DNGS facilities, and protecting prescribed information.

As part of the LTC application, potential risks were identified and analyzed through the preparation of a Site-Specific Threat and Risk Assessment which considers physical site characteristics that could impede the development and implementation of current and future adequate security measures. Additional Threat and Risk Assessments will be conducted at each phase of the project with security measures evaluated against these Threat and Risk Assessments to ensure credible threats are mitigated.

The program ensures security readiness and maximizes response capability to contain, mitigate and terminate security events. OPG continues to build strength in identifying areas for improvement by tackling adverse trends and processes to drive continuous improvement efforts. On an annual basis, OPG reviews its Memorandum of Understanding with Durham Region Police Service. This memorandum defines mutual responsibilities and provides a strong foundation for continued productive and integrated working relationships between Durham Region Police Service and OPG. As well, OPG Nuclear Security continues to maintain excellent working relationships with off-site emergency response organizations.

Improvements include several strategic initiatives aimed at implementing innovation and technology opportunities. These include mitigating security impairments with the use of security clearance system electronic application upgrade.

Furthermore, following a significant review of the overall program, OPG has initiated a Security Excellence plan focused on enhancing human performance and improving regulatory compliance.

OPG believes these improvements will better serve the industry and the program to maintain safe conditions in support of mitigation to security risk to all OPG assets.

OPG remains accountable to ensure adequate measures are in place for the administration and facilitation of persons entering, working at and exiting from the DNNP site. OPG has a robust security program in compliance with regulatory requirements that will continue to ensure the continued protection of people and assets through the construction phase and eventual operation of the DNNP.

#### **4.12.1 Cyber Security**

OPG's comprehensive cyber security program is applied to its nuclear power plant fleet, including the DNNP BWRX-300, and meets all regulatory requirements. The program, which is continually improved with Operational Experience, benchmarking, and industry best practices, is an integral part of OPG's commitment to maintain and enhance its cyber security measures.

OPG's cyber security program and procedures are based on several key pillars:

- A preventative defence strategy coupled with a well-structured security framework.
- Comprehensive policies and procedures.
- An effective system for asset identification and classification.
- Clearly delineated roles and responsibilities.
- Rigorous security controls.

The BWRX-300 Cyber Security Program Plan is designed to meet regulatory requirements, relevant industry standards and best practices for the design, operation, and protection of the BWRX-300 I&C systems. The BWRX-300 Cyber Security Program Plan applies advanced security principles throughout the product development and deployment lifecycle of the BWRX-300 I&C systems. The program is based on three key principles:



- 1) Regulatory compliance,
- 2) integration of cyber security controls into the BWRX-300 I&C systems development process, and;
- 3) integration of cyber security features into the BWRX-300 I&C systems.

The BWRX-300 Cyber Security Program Plan recognizes that protecting cyber essential assets is an ongoing program throughout the I&C system development and operations stages. It is designed to:

- Implement security controls to protect the necessary digital assets from cyber attacks
- Apply and maintain Defence-in-Depth protective strategies to ensure the capability to detect, respond to, and recover from cyber attacks
- Mitigate the adverse effects of cyber attacks
- Ensure functions of protected assets are not adversely impacted due to cyber attacks

Moreover, OPG utilizes specialized cyber security training, promoting individual skillsets across a range of nuclear-related business sectors. This training facilitates smooth configuration and lifecycle management through specific change control processes for cyber essential assets. These processes, fortified with security elements, comply with industry standards such as the CSA N290.7-14[R-34].

OPG embeds nuclear cyber security into all its programs, including the DNNP. The cyber security team is incorporated into the project, ensuring all the listed pillars and practices are effectively applied. This team ensures the inclusion of key steps within procedures and training and participates actively in company-wide cyber security meetings.

OPG has an established procedure to respond promptly to cyber security incidents. OPG has developed a reporting system within the scope of its cyber security program and procedure. Additionally, recovery plans are integral to the individual controls of cyber essential assets, leading to swift action when required. This guarantees that all OPG projects, including the new build project, are well-fortified and resilient to any potential cyber threats.



#### 4.13 Safeguards and Non-Proliferation

OPG has an effective Safeguards and Nuclear Material Accountancy program for the successful implementation of the obligations arising from the Canada/IAEA safeguards agreement and non-proliferation Treaty, that meets CNSC regulatory requirements.

The program that is in place at existing operating nuclear facilities includes:

- Strict inventory tracking of nuclear materials by use of a nuclear material accountancy software;
- Training of staff involved with the maintenance, inspection, verification or movement of nuclear materials on the requirements of reporting and tracking information in software or by physical means;
- Site specific operating procedures that provide instructions on meeting the established Safeguards agreement;
- Rigorous access control to areas that contain nuclear materials; and
- Responsibilities of facility specific Safeguards Officers to perform day-to-day safeguard related duties.

The proposed activities under a Licence to Construct for DNNP do not include the receipt or handling of nuclear fuel. OPG will ensure that nuclear accountancy and control measures will be in place in support of a future application to receive and handle nuclear fuel at the DNNP. Additionally, OPG will meet the requirements such as declarations pursuant to the Additional Protocol on future plans and provide access and assistance to IAEA inspectors for complementary access.

The construction phase will include the construction of prescribed equipment and the installation of safeguards equipment that is subject to safeguards obligations.

Measures to control access to prescribed equipment, as well as prevent loss or illegal use, possession, or removal of prescribed equipment, already exist, or will be developed upon identification that any such equipment will be used during the licensed activities.

OPG has a number of Import and Export licences related to DNNP that will continue to be managed separately from the current PRSL and the proposed construction licence.

The records required by safeguards agreements will be kept and disclosed as appropriate to the CNSC and IAEA inspectors.

#### **4.13.1 Design Information Questionnaire**

OPG has submitted a Design Information Questionnaire (DIQ) for the facility to the CNSC as part of the supporting documents for the DNNP LTC Application. The DIQ provides the IAEA and CNSC with information pertaining to the facility's design, operation, locations of nuclear material inventory and nuclear material flow points. This ensures that the IAEA has the required information to establish safeguards measures and responsibilities.

OPG has committed to update the DIQ as needed to ensure that general information describing the facility, design and operation, nuclear material descriptions, processing and flow of nuclear materials, safeguards measures, and accounting and reporting of nuclear materials are accurate, up-to-date, and available to support a Design Information Verification inspection during future operations. Design Information Verifications are supported by Safeguards Officers and impacted work groups through planned or unplanned inspections.

#### **4.13.2 Safeguards Equipment**

Safeguards equipment for containment and surveillance is developed by the IAEA as a result of the DIQ and proposed safeguards approach. OPG will provide the IAEA with any requested assistance to facilitate access for the installation of safeguards equipment, including remote monitoring and surveillance systems.

OPG maintains a strong program and working culture based on IAEA support and respect for safeguards equipment and seals. Individuals that work on, around or near IAEA equipment will be trained to identify and not manipulate any IAEA equipment or seals. Future operating procedures will be developed outlining required responses and notifications in the event that services are lost, or damage occurs to IAEA equipment.

#### **4.13.3 Access and Assistance to IAEA**

OPG's safeguards implementing standard gives guidance on the reporting requirements and access by IAEA inspectors into the facilities. Under CNSC regulatory requirements, OPG will provide access to the IAEA following notification and identified scope of activities. OPG will provide prompt access for all reasonable requests on short notice for access to applicable DNNP facilities and equipment.

#### 4.13.4 Nuclear Accountancy and Control

As previously noted, the proposed licensed activities from the DNNP LTC Application do not include the receipt or handling of nuclear fuel.

As per applicable CNSC requirements for a future operating licence, OPG will submit DNNP documents supporting Canada's Safeguards and Nuclear Material Accountancy obligations. Safeguards related information is maintained on a Nuclear Material Accountancy software, which provides near real-time inventory of:

- Fresh and irradiated fuels;
- Fuel that is in the reactor core;
- Fuel that is located anywhere else within the facility to support operations; and
- Other relevant non-fuel nuclear material required to support operations.

OPG will ensure that nuclear accountancy and control measures will be in place in support of a future application to receive and handle nuclear fuel at the DNNP.

OPG has a mature safeguards and non-proliferation program that will be implemented in a phased approach as the project proceeds through construction and eventual fuel-in commissioning and operation.

#### 4.14 Packaging and Transport

The Packaging and Transport covers programs for the safe packaging and transport of nuclear substances to and from the facility.

The proposed licence activities under the LTC application will not involve any possession or use of nuclear substances or prescribed equipment.

While construction related tools containing radioactive nuclear substances may be used, these will be under the authority of separate CNSC nuclear substance and device licences. As such, no packaging and transportation of nuclear substances are expected under the proposed construction licence.

OPG has a mature and effective packaging and transport program that meets or exceeds all applicable regulatory requirements and related objectives. The objective of the program is to ensure the safe packaging and transportation of nuclear substances and radiation devices to and from OPG's nuclear facilities such that the risk to the public, workers and the environment is low.

The program addresses package engineering, qualification and certification, operations and maintenance (including periodic testing and inspection), records, staff training, preliminary event notification and transportation emergency response.

OPG has been safely transporting radioactive materials within nuclear sites, and between nuclear facilities, since the 1960s, when its predecessor company, Ontario Hydro, operated the Douglas Point nuclear station for Atomic Energy of Canada Ltd. In OPG's 50 years of Radioactive Materials Transportation, and over many millions of kilometers travelled, there has been no accident resulting in any injury to a driver or a member of the public or any release of radioactivity.

OPG's transportation packages are designed, analyzed and tested, certified as necessary, manufactured, operated and maintained according to OPG's procedures, and meet or exceed the regulatory requirements of the Canadian Nuclear Safety Commission and Transport Canada.

While there have been shipments of enriched fuel in Canada – for example, for refueling of research reactors and to repatriate spent enriched fuel from research reactors to the United States - OPG does not currently transport enriched fuel.

The shipments of fresh and spent enriched fuel for the BWRX-300 will be in accordance with the CNSC Packaging and Transport of Nuclear Substances Regulations, 2015 and the Nuclear Security Regulations, or amended or successor regulations. Detailed information pertaining to radioactive transportation operations specific to the DNNP is to

be addressed in later licensing stages. The information provided will effectively facilitate commissioning before fuel load and allow preparation for the transition to fuel-in commissioning and operation upon a future Licence to Operate.

## **5.0 OTHER MATTERS OF REGULATORY INTEREST**

### **5.1 Environmental Assessment**

The DNNP underwent an Environmental Assessment (EA) between 2006 and 2009, under the 1992 Canadian Environmental Assessment Act. The EA assessed the lifecycle for up to four nuclear power reactor units supplying up to 4800 megawatts (MW) of electrical capacity. The results of the EA were documented in the DNNP Environmental Impact Statement (EIS).

The EA was conducted using a Plant Parameter Envelope (PPE) approach, wherein a range of design parameters and variables were considered based on the reactor technologies being contemplated at the time.

In 2012, a Joint Review Panel (JRP) of the Canadian Environmental Assessment Agency (CEAA) and CNSC concluded that the Project is not likely to cause significant adverse environmental effects, taking into account the implementation of mitigation measures [R-35].

In accepting the recommendations of the JRP and approving the DNNP under the 1992 Canadian Environmental Assessment Act, the Government of Canada stated that: "Any Regulatory Authority under the CEAA will need to determine whether the future proposal by the proponent is fundamentally different from the specific reactor technologies assessed by the JRP and if a new EA is required under the CEAA" [R-36].

Following reactor technology selection at the end of 2021, as part of its application for a licence to construct, OPG undertook a review of the PPE and EIS that demonstrated that results of the EIS remain valid for the deployment of four BWRX-300 small modular reactors.

The results of the PPE and EIS Review were the subject of a January 2024 CNSC Public Hearing for Determination of Applicability of Darlington New Nuclear Project Environmental Assessment to OPG's Chosen Reactor Technology. In April 2024, the Commission determined that the 2012 Environmental Assessment remains valid for the deployment of four GEH BWRX-300 units at the Darlington Site.

## 5.2 Public Information and Disclosure Program

OPG is committed to open and transparent communication. Our Nuclear Public Information Disclosure and Transparency Protocol ensures information is provided in a timely manner to the public, our host communities and stakeholders. Information is communicated in a number of ways to ensure a clear understanding of OPG's nuclear operations, activities and projects. This ensures the public can make informed, objective decisions through readily accessible information and open and ongoing dialogue.

OPG's Corporate Relations organization adheres to the standards and procedures for external communications governed by the OPG standard for Nuclear Public Information and Disclosure. This standard provides the expectations and requirements for OPG's stakeholder activities, public response requirements for issues or significant events and communications with the public. OPG's Nuclear Public Information Disclosure and Transparency Protocol is posted to our public website:

<https://www.opg.com/documents/nuclear-public-information-disclosure-and-transparency-protocol/>.

OPG's stakeholder relations and public information program has been recognized as a strength by national and international utility peers. OPG benchmarks current best practices amongst others within and outside the nuclear industry to ensure continuous performance improvement. OPG's relationship with the local community remains strong due to ongoing open engagement and sustainable partnerships with community stakeholders including government, media, business leaders, educational institutions, interest groups and community organizations.

### Communications and Engagement – Darlington New Nuclear Project

OPG has been engaging with the local community in Durham Region for more than 50 years since the construction of our existing nuclear facilities. Additionally, since 2006 at the outset of the DNNP, OPG has undertaken a comprehensive outreach and communications program with stakeholders and the public on all phases of the project. This robust program has kept the public and stakeholders informed about the DNNP by integrating with and building on the existing public information program for the DNGS.

To ensure targeted and thorough engagement, the program is augmented to include activities and/or stakeholders potentially interested in the DNNP, but who are typically outside the scope of the DNGS program.

Members of the public and stakeholders are continually updated on the status of the DNNP, through various methods and forums including:

Information sharing and community outreach via:

- A fully staffed public information centre;
- A dedicated public website: [www.opg.com/newnuclear](http://www.opg.com/newnuclear);
- A toll-free information phone line;
- Environmental partnerships and programs;
- Station tours and site visits;
- Public inquiries and feedback;
- Public opinion polling;
- Community stakeholder letters;
- Social media platforms (Facebook, Twitter/X, Instagram, LinkedIn);
- Advertising (local publications, newsletters, television and radio);
- Contact us information (email, website, phone number) included in all communication materials;
- Briefings with key stakeholder groups, elected officials and municipal representatives;
- Presentations and site tours of the DNNP lands to community groups, key stakeholders, industry peers, partners and the public;
- Virtual reality tours of the BWRX-300 SMR technology to information centre visitors, tour groups, stakeholders and the public;
- Project updates and dedicated DNNP inserts in OPG's regularly issued Neighbours Newsletter, distributed to ~250,000 residents and businesses within ten kilometers of the Pickering and Darlington Nuclear Generating Station sites and posted to OPG's public website;
- DNNP booth, SMR virtual reality experience and information available at OPG's annual public open house (Community Power Expo), which in recent years has drawn over 3,000 people per year;



- Project information booths at community fairs, festivals and events offering information about the project status, next steps and how the public can be involved in the licensing process; and
- Regular updates to community committees (including the Darlington and Pickering Community Advisory Councils, and the Durham Nuclear Health Committee), Clarington Board of Trade and Office of Economic Development.

OPG has undertaken continued engagement activities to ensure stakeholders and members of the public are informed, provided required information and are offered opportunities to ask questions and provide feedback. through the following methods:

Key information on OPG's Licence to Construct application including OPG's desire to apply for a licence, the purpose of applying, the activities involved/required (Environmental Assessment study validation, etc.) and the estimated timeline (interventions, hearings, etc.) was shared throughout the licensing phases of the project in several ways including:

- A copy of the Licence to Construct application was posted prominently on OPG's public DNNP website ([www.opg.com/newnuclear](http://www.opg.com/newnuclear)) for stakeholders and members of the public to review. OPG also posted the CNSC's Notice of Public Hearing and Participant Funding to the project website.
- More than 800 stakeholders and members of the public registered for four public information sessions on the project. The sessions provided a project update, introduced the Environmental Impact Statement review and Plant Parameter Envelope review, the Licence to Construct application and timeline, and outlined mechanisms for the public to be involved in the licensing process. The sessions also provided an opportunity for the public to ask questions and share their views.
- Stakeholder letters were sent to approximately 80 local community leaders and stakeholders several times throughout the year. These letters contained a project update including specifics on the Licence to Construct process and the opportunities to participate in CNSC public hearings.
- Dedicated presentations on the project status, including Licence to Construct were provided to the Darlington and Pickering Community Advisory Committees and the Durham Nuclear Health Committee. Project updates were provided at all meetings as part of the community update agenda item.
- Presentations and site tours of the DNNP lands to community groups, key stakeholders, industry peers, partners and the public.

- 3500 members of the community attended our annual Community Power Expo in 2023, where we had a dedicated DNNP space represented by all project partners with updates on the project and licensing phases.
- Engaged with more than 10,000 people at 30+ community-wide events, festivals and project kiosks, providing updates on the project and an opportunity to answer questions, including on the Licence to Construct process.

Throughout subsequent phases of the project, OPG will continue to engage with the public and stakeholders including information specific to the Licence to Construct through:

- Quarterly project update letters including summaries of our engagement and public feedback to interested parties.
- Project updates to community committees.
- Project kiosks in high traffic community centers/locations allowing the public to visit and ask questions in a convenient and accessible location.
- Stakeholder roundtable updates to community leaders, local elected officials and Municipal and Regional staff.
- In-depth project workshops with Municipal, Regional, Provincial stakeholders and organizations.
- Public Information Sessions to provide project updates and information and an opportunity to ask questions on Licence to Construct to interested members of the public.
- Presentations and site tours of the DNNP lands to community groups, key stakeholders, industry peers, partners and the public.
- OPG's Community Power Expo including a focused project area, information and staff on hand to discuss the project and Licence to Construct.
- Continued OPG attendance at community fairs, festivals and events across Durham Region with materials on the DNNP and project staff available to discuss the project, including the Licence to Construct process.
- Ongoing project website updates.
- Advertising in local publications, television and radio as applicable.
- A targeted social media presence.

- Project posters located in community spaces including a link to the project website.
- Project information and dedicated inserts in issues of Neighbours newsletter.
- Ongoing opportunities to engage with local community groups and provide a presentation on the DNNP through OPG's "Electrifying Community" program (Event > Electrifying Community Information Sessions – OPG).
- Ongoing opportunities to engage with local school-aged children and educators on the DNNP through OPG's "Electrifying Education" program (Event > Electrifying Education Presentations – OPG).

OPG's role is much more than the kilowatts it produces for the people of Ontario. We value our relationships with Indigenous Nations and Communities, our stakeholders in communities where our facilities are located, as well as the broader public. We strive to be engaged and valued community members, sharing information early and often, and offering and encouraging dialogue with our neighbours, local community and our stakeholders.

OPG has undertaken a comprehensive outreach and communications program including activities designed to reach a broad audience of stakeholders and the public to ensure they are informed on the DNNP. OPG will continue to maintain the comprehensive outreach and communications program and activities through all phases of the project.

### 5.3 Indigenous Engagement

OPG acknowledges the Aboriginal and Treaty Rights of Indigenous Nations and Communities as recognized in the Constitution Act, 1982. OPG's Indigenous Relations policy provides a framework for engaging with Indigenous peoples, advancing reconciliation and regular reporting on the company's activities and progress in achieving established goals, including OPG's Reconciliation Action Plan.

OPG's objective with respect to engagement with Indigenous Nations Rights holders and interested Indigenous Nations and Communities is to share information on DNNP, understand concerns and potential impacts to Aboriginal and Treaty Rights, promote dialogue and meaningful engagement, and create opportunities for participation in the development, implementation and review of mitigation measures informed by Indigenous Knowledge Systems. This engagement is built on an evolving relationship of mutual trust and respect.

In response to the proposed growth of the nuclear sector, OPG recognized that proactive steps needed to be taken in order to continue to meaningfully support our relationships with Indigenous Nations and Communities, and to achieve our reconciliation goals. In 2023, the Indigenous Relationships and Partnership team added capacity to the DNNP project team which now includes three full-time staff, supported by a director. OPG also created an internal readiness training program which is mandatory for all DNNP team members to participate in. This half-day training includes Treaty knowledge, education on the duty to consult, perspectives on working with Indigenous Nations and Communities, culture and traditions. As of December 2023, OPG met their interim goal of having 60% of DNNP team members take the training. In addition to OPG's new internal training strategy, we have also invested in the development of an energy education module, "Generation for Generations". This has been designed to help bring knowledge to Indigenous Communities, organizations and individuals about the history of energy in Ontario, how the grid works, who is responsible for which areas and much more. This training module can be customized to meet the education needs of each audience and will begin its pilot phase in Summer 2024.

OPG is also committed to providing capacity to support ongoing engagement with Indigenous Nations and Communities regarding the company's nuclear facilities and operations. OPG has entered into relationship framework agreements with Curve Lake First Nation, Hiawatha First Nation, and the Mississaugas of Scugog Island First Nation and is currently working to finalize an agreement with Alderville First Nation. The relationship framework agreements provide capacity to support regular meetings, information sharing and ongoing two-way dialogue with Indigenous Nations and Communities with respect to OPG's existing assets, operations, and initiatives.

DNNP also currently operates three project capacity agreements with Curve Lake First Nation, Hiawatha First Nation, and the Mississaugas of Scugog Island First Nation, all members of the Williams Treaties First Nations. A fourth agreement is in discussion with Alderville First Nation, also a WTFN member. The purpose of these agreements is to ensure that Indigenous Nations and Communities can engage meaningfully on the project. Capacity funding has also been provided to other Indigenous Communities based on submitted costs and expenses.

OPG recognizes that construction activities may have impacts to Aboriginal and Treaty Rights of the WTFNs. OPG endeavors to continue to work with Indigenous Nations and Communities to identify any impacts associated with the project, and to achieve mitigation measures informed by Indigenous Knowledge Systems.

OPG has engaged with the local Rights holders (WTFN) since 2018 on Small Modular Reactor Development as per CNSC REG DOC 3.2.2[R-37] and the Province of Ontario's direction on the delegation of the duty to consult in 2021 and amendment in 2024. WTFN member First Nations are:

- Beausoleil First Nation
- Rama First Nation
- Georgina Island First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Alderville First Nation

Current engagement and consultation goals include, but are not limited to:

- Information sharing
- Engagement and employment opportunities
- Constructive dialog and involvement
- Trust building and collaboration
- Meaningful consultation
- Sustainable and empowered relationships

Engagement has also included invitations to virtual and in-person meetings, recurring meetings, newsletters, project permitting reviews and review of project activities which may impact Aboriginal or Treaty Rights. There are ongoing discussions on environmental impacts and monitoring, natural habitat restoration initiatives, archaeological monitoring, community visits and meetings with the leadership of Indigenous Nations and Communities. These discussions primarily take place during regularly scheduled meetings which occur twice monthly with the WTFNs (one focused on knowledge sharing, one on permitting). We also have quarterly meetings with the Metis Nation of Ontario, Region 8. Discussions have begun on future restoration planning and building a model for what this could include. OPG has committed to quarterly meetings with WTFN on this subject and have proposed dates for 2024.

As OPG reported at the January 2024 Hearing for Determination of Applicability of Darlington New Nuclear Project Environmental Assessment to OPG's Chosen Reactor Technology, OPG has agreed to support the four Mississauga Nations on developing an Indigenous Knowledge Systems Study which will help to inform DNNP on its environmental monitoring collaboration with the Nations. Through our discussions with the WTFNs it is understood that the Indigenous Knowledge Systems Study could become the basis for additional studies which could include:

- Cumulative Effects Study; and
- Rights Impact Assessment.

In addition, OPG is committed to supporting and working with the Rights holders to develop an Environmental Monitoring Augmentation Plan which would incorporate an Indigenous lens into our current environmental monitoring programs. Through this, we hope to identify opportunities to expand and strengthen processes and recognize ways that OPG can ensure our work doesn't only meet standards but exceeds them.

OPG understands that the safe-handling and storage of radioactive waste is of particular interest to First Nations throughout Ontario. For this reason, we regularly invite Rights holders and other interested Indigenous Nations and Communities holders to tour waste management facilities at OPG's Darlington and Pickering nuclear generating sites to see how spent fuel is safely managed and stored from existing operations. On August 24th, 2023, OPG provided a presentation about radioactive waste to WTFNs and began the process of knowledge-sharing. A follow-up DNNP radioactive (Low, Intermediate and High Level) waste discussion occurred on November 23, 2023, with continued engagement on the low, intermediate and high-level waste interim and long-term management plans on April 25, 2024. WTFNs have relayed the importance of safe storage of radioactive waste from their communities' perspectives; there is also a desire for them to learn more about waste storage best practices. OPG will continue to share information about its waste management practices and discuss opportunities regarding DNNP waste throughout the engagement process.



OPG is committed to exploring Indigenous commercial participation for new projects. To accomplish this with DNNP, OPG has been engaging with those Williams Treaties First Nations who expressed interest. Our conversations began in 2021 and were formalized in writing in 2022 allowing us to explore mutually beneficial commercial participation opportunities. Participating WTFN and OPG teams have been meeting on a bi-weekly basis to advance concepts, work through questions, and resolve issues to narrow in on a proposed financial structure that meets the objectives of all parties. OPG has provided capacity funding throughout this process, including for the establishment of a new First Nation partnership on April 1, 2024. The First Nation partnership is intended to represent the collective economic interests of the participating WTFN in the DNNP commercial discussions moving forward. Indigenous Communities with interests in the project have been engaged at various levels, these include the Métis Nation of Ontario Region 8, Kawartha Nishnawbe, Six Nations of the Grand River, Mohawks of the Bay of Quinte, Huron-Wendat Nation, and Saugeen Ojibway Nation.

OPG is committed to working with Indigenous Nations and Communities with Rights, asserted Rights and interests regarding project activities to develop positive, mutually beneficial relationships. OPG recognizes that each Indigenous Nation and community is distinct with its own unique history, worldviews and concerns. Engagement has included invitations to virtual and in-community meetings, the provision of project information for review, project newsletters and participation in reviewing of project materials.



**Figure 22: OPG Indigenous Relations representatives meet with the Chief and Council of Alderville First Nation, Oct 19, 2023**

A summary of key engagement topics for the period of May 2023 to April 2024 included cultural teachings, project permits, project design for shoreline protection, nuclear waste management, Small Modular Reactor site layout, potential impacts to Aboriginal and

Treaty Rights and site visits. Details on key engagements within the specified date range can be found below. Engagement prior to May 2023 can be found in CMD 24-H2.1 [R-38].

- In May 2023, OPG met with the Mississaugas of Scugog Island and Alderville First Nations to discuss capacity agreements, DNNP, electricity generation in the province and steps toward better relationship building.
- During a regular monthly meeting with the Mississauga Nations of the WTFN, topics included a DNNP update, relationship building fundamentals and permits required as part of the SMR program.
- June 2023 saw Indigenous Relations representatives participate in the annual Métis Heritage Day in Oshawa with an information booth focused on DNNP and the Indigenous Opportunities Network (ION) program.
- Outreach was conducted with the Mohawks of the Bay of Quinte in June 2023 regarding the status of the DNNP and SMR as well as the CNSC Hearing for Determination of Applicability of Darlington New Nuclear Project Environmental Assessment to OPG's Chosen Reactor Technology.
- At a regular monthly meeting with the Mississauga Nations of the WTFN, a DNNP update was provided along with a discussion on in-site monitoring/testing, species at risk, beneficial actions areas as part of the Endanger Species Act permit, in addition to other pending permits.
- In July 2023, correspondence was undertaken with the Huron-Wendat Nation regarding the finalization of the marine archaeological report associated with SMR development.
- On July 8, 2023, Indigenous Relations and ION representatives operated an information booth during the Alderville pow wow.
- At a regular monthly meeting with the Mississauga Nations of the WTFN, a DNNP update was provided along with a discussion on environmental compliance approvals and species at risk.
- An update meeting with the Métis Nation of Ontario Region 8 was held in September 2023 with a focus on DNNP, nuclear waste operations and the DNNP site Environmental Assessment for the SMR and environmental monitoring.
- In September 2023, Indigenous Relations representatives were invited to participate in the quarterly Curve Lake First Nation harvester's gathering and discussed DNNP, employment and supply chain opportunities, as well as the licensing process for the hearing for Determination of Applicability of Darlington



New Nuclear Project Environmental Assessment to OPG's Chosen Reactor Technology in January 2024. The month also saw OPG staff receive teachings at Petroglyphs Park from a Curve Lake First Nation Elder to enhance their knowledge of local Indigenous culture and history.

- The regular monthly meeting with Mississauga Nations of the WTFN saw updates given on DNNP, stormwater management planning, site preparation for construction activities, soil spoil piles, and permits associated with the SMR.
- On October 19, 2023, Indigenous Relations representatives met with the new Chief and Council of Alderville First Nation to discuss DNNP, electrical generation, nuclear information as well as a tour of the First Nation's solar farm and Black Oak Savanna cultural site.
- Curve Lake First Nation hosted a career fair on November 2, 2023, that featured the variety of roles found within OPG's Advance Maintenance and Inspection function, a hands-on event which proved popular with First Nations student and community members.
- On November 23, 2023, representatives of Curve Lake and Hiawatha First Nations toured the Darlington Waste Management Facility followed by a presentation from the Nuclear Sustainability Services.
- The calendar year ended on December 7, 2023, with a tree ceremony conducted by an Elder from Curve Lake First Nation ahead of clearing work; the trees were thanked, and tobacco was offered.
- January 2024 saw engagement with Curve Lake and Hiawatha First Nations regarding engagement on cultural elements to be incorporated into the planned DNNP Administration Building.
- During the January 18, 2024 meeting, three permits were reviewed: Endangered Species Act (ESA), Permit to Take Water, and Overall DNNP & Stormwater Management Environmental Compliance Approval (ECA) Amendment.
- On January 31, 2024, a virtual meeting was held with the consultation representative for Alderville First Nation regarding a draft Capacity Agreement.
- February 14, 2024, saw the Chief of Rama First Nation and Nation representatives receive an overview of OPG Nuclear, waste operations and DNNP, followed by a tour of Darlington Station.

- The February 2024 regular meeting with the Mississauga Nations of WTFN covered the CCW system, shoreline protection, the thermal effects assessment (including non-thermal effects), and approaches to offsetting.
- The February 22, 2024, whiteboard meeting with the Mississauga Nations of WTFN consisted of a review of the proposed 2024 Roadmap with the Nations (scope of Indigenous Knowledge Study, Rights Impact Assessment, restoration meetings), and update on permits and the Environmental Risk Assessment (ERA) at DNGS.
- On March 13, 2024, an update meeting pertaining to the status of marine archaeology was held with the Mississauga Nations of WTFN representatives, which focused on chance find protocols and the status of the report submitted to MECP. WTFN representatives requested a summary document cover key actions taken and planned on this subject.
- March 13, 2024, saw the DNNP project team met with representatives of Metis Nation of Ontario Region 8. The purpose of the meeting was to review the submitted intervention on the EIS applicability and technology selection and answer queries not already answered. Topics included the status of SMR sites 1 through 4, the archaeological protocol for chance finds, status of bank swallows, the SMR climate change plan in addition to initial waste planning for the site.
- On March 18, 2024, representatives of OPG, Aecon and the architects contracted to work on the planned SMR Administration Building held an update meeting with Hiawatha First Nation. The purpose was to review Indigenous elements for the buildings design and grounds provided by the Nation to date and consider additional elements.
- The regular whiteboard meeting of March 21, 2024, with the Mississauga Nations of WTFN representatives focused on the Environmental Compliance Approval application and the MNRF work permit related to borehole drilling and geotechnical work. The status of the planned Indigenous Knowledge Study was also discussed.
- March 27, 2024, saw representatives of OPG Indigenous Relations and Human Resources participate in the Georgina Island Career Fair focused on the building trades. Potential candidates were encouraged to apply to the ION program for consideration, which may include work opportunities related to DNNP.
- The monthly March 28, 2024, meeting with the Mississauga Nations WTFN representatives focused on environmental updates, shoreline protection plans and the draft DNNP climate change assessment report, which was submitted to WTFN for review and comment.

- April 2, 2024, brought together Mississauga Nations WFTN representatives separate from OPG to discuss the Indigenous Knowledge Study, and collectively agreed that Mississaugas of Scugog Island First Nation staff will draft a framework embedding traditional governance structures to guide the execution of the Indigenous Knowledge Study. The draft framework will be circulated to each community for feedback and revisions before submission to the respective Chief and Councils of the Mississauga Nations.
- On April 8, Alderville First Nation Chief and Council signed a proposed Capacity Agreement regarding the DNNP. The agreement is in process to be executed by DNNP and will be operable between April 1, 2024, and March 31, 2026.

Additional engagement efforts have included employment opportunities through the ION program, including career fair events with a focus on the trades. In 2023, the ION program placed 32 Indigenous candidates into various roles within the energy sector. Since the program's start in 2018, ION has made 127 placements. The partnership between Kagita Mikam Aboriginal and Training, OPG and the Electrical Power Systems Construction Association to support ION was renewed with increased funding in the expectation of continued growth in the program stimulated by DNNP construction.

OPG also surpassed its Indigenous procurement goal of \$84 million with a spend of \$141 million. In the first quarter of the 2024 fiscal year, \$17 million in Indigenous procurement was added for a total of \$158 million for the period between January 2023 to April 2024. A nation-wide team of external Indigenous Business Developers is supporting this effort by finding and referring Indigenous businesses to OPG and our project partners.

Both activities are key elements of OPG's Reconciliation Action Plan.



**Figure 23: Representatives of OPG Supply Chain, Human Resources, Advanced Inspection and Maintenance and Indigenous Relations at Curve Lake First Nation Career Fair November 2, 2023**

## **5.4 Cost Recovery**

Annual fees determined by the CNSC required under Part 2 of the Canadian Nuclear Safety Commission Cost Recovery Fees Regulations are included and budgeted for in OPG's business plans. During the current licensing period, upon receipt of invoices, OPG has provided regular payments to the CNSC. OPG will continue to make payments as required.

## **5.5 Financial Guarantees**

The NSCA and its Regulations require that applicants make adequate provisions for the decommissioning of facilities licensed by CNSC. CNSC REGDOC-3.3.1, Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities provides guidance regarding the establishment and maintenance of measures to fund the decommissioning of nuclear facilities.

In June 2022, the CNSC Commission accepted OPG's financial guarantee for the PRSL. A financial guarantee in the form of a draft Letter of Credit instrument has been provided to CNSC staff to supplement the LTC Application. The Letter of Credit would satisfy the CNSC requirement for a five-year financial guarantee period from 2025 to 2029. This Letter of Credit would replace the current financial guarantee for the PRSL, following the issuance of the proposed licence to construct.

For the period post-2029, OPG will provide CNSC with an updated assessment of the financial guarantee in 2029 or before the CNSC Hearing for DNNP Power Reactor Operating Licence, whichever is earlier.

## **5.6 Nuclear Liability Insurance**

Under a future Licence to Construct, there are no activities that will result in nuclear material being on site. As such, Nuclear Liability Insurance and limit is not applicable for the license application.



## 6.0 OVERALL CONCLUSION

OPG's history of safe operations and project management success, in particular large nuclear projects such as the Darlington Nuclear Refurbishment Project, demonstrates OPG's readiness to undertake the construction of a BWRX-300 unit at the Darlington New Nuclear Site. The BWRX-300 leverages operating experience from generations of previous BWRs, providing enhanced safety features that are demonstrated through the Licence to Construct Application.

OPG is committed to delivering the project in an environmentally sustainable manner. The Darlington New Nuclear Project will be a significant step for OPG towards net-zero carbon company by 2040 so that we can act as a catalyst for a net-zero carbon economy by 2050. OPG is committed to continuing to build partnership with Indigenous Nations and local communities as it works towards achieving these goals.

Under the existing site preparation licence, in its application for a licence to construct, and in response to the information requests by CNSC staff, OPG has demonstrated that it:

- is qualified to carry on the proposed licensed activities, and
- will make adequate provisions for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

As such, OPG respectfully requests the Commission approve OPG's Darlington New Nuclear Project Power Reactor Construction Licence for one BWRX-300 unit. OPG also requests that the Commission accepts OPG's proposed Financial Guarantee for DNNP as part of the requested Power Reactor Construction Licence.

## REFERENCES

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## GLOSSARY

**ALARA** A principle of radiation protection that holds that exposures to radiation are kept as low as reasonably achievable, social and economic factors taken into account.

**Best Practice** An industry-accepted approach (for example, toward a design, process or procedure) that is acknowledged as consistently producing superior results.

**Beyond-Design-Basis Accident (BDBA)** An accident less frequent and potentially more severe than a design-basis accident.

**Boiling Water Reactor (BWR)** A common type of light-water reactor, where water is allowed to boil in the core, generating steam directly in the reactor vessel to generate electrical power.

**Canadian Nuclear Safety Commission (CNSC)** Canada's nuclear regulator, established under the Nuclear Safety and Control Act to regulate the use of nuclear energy and materials to protect health, safety, security and the environment; to implement Canada's international commitments on the peaceful use of nuclear energy; and to disseminate objective scientific, technical and regulatory information to the public.

**Commissioning** With respect to a reactor facility, a process intended to demonstrate that installed Structures, Systems and Components (SSCs) perform in accordance with their specifications before the facility is placed in service or before the SSCs are returned or placed in service.

**Complementary Design Feature** A design feature added to the design as a standalone structure, system or component or added capability to an existing SSC to cope with design extension conditions.

**Construction** The process of procuring, manufacturing and assembling the components, carrying out civil work, installing and maintaining components and systems, and performing associated tests.

**Core Damage** Accident leading to significant fuel degradation. For CANDU reactors, core degradation is defined as extensive physical damage of the multiple fuel channels due to overheating leading to loss of core structural integrity.

**Core Damage Frequency** An expression of the likelihood that an accident could cause core damage.

**CSA Group** A standard-setting body that works with the regulator, industry and stakeholders to produce consensus-based Canadian industry standards that may be used by the regulator or industry. Formerly called Canadian Standards Association.

**Decommissioning** Administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility, location or site where nuclear substances are managed, used, possessed or stored.

**Defence In Depth** A hierarchical deployment of different levels of diverse equipment and procedures to prevent the escalation of anticipated operational occurrences and to maintain the effectiveness of physical barriers placed between a radiation source or radioactive material and workers, members of the public or the environment, in operational states and, for some barriers, in accident conditions.

**Design Authority** The entity that has overall responsibility for the design process, or the responsibility for approving design changes and for ensuring that the requisite knowledge is maintained.

**Design Basis** The range of conditions and events taken explicitly into account in the design of a nuclear facility, according to established criteria, such that the facility can withstand this range without exceeding authorized limits. Note: Design extension conditions are not part of the design basis.

**Design-Basis Accident (DBA)** Accident conditions for which a nuclear facility is designed according to established design criteria and for which damage to the fuel and the release of radioactive material are kept within authorized limits. DBA is a plant state.

**Design Extension Conditions (DEC)** A subset of beyond-design-basis accidents that are considered in the design process of the facility in accordance with best-estimate methodology to keep releases of radioactive material within acceptable limits. Design extension conditions could include severe accident conditions. DEC is a plant state.

**Deterministic Safety Analysis** An analysis of a nuclear facility's responses to an event, performed using predetermined rules and assumptions (such as those concerning the initial facility operational state, availability and performance of the facility systems and operator actions).

**Equipment Pool** A pool located at the opposite end of the Reactor Building Cavity from the RB Pool that holds the dryer and separator during the refueling outage.

**Environmental Risk Assessment (ERA)** A process that identifies, quantifies and characterizes the risk posed by contaminants (nuclear or hazardous substances) and physical stressors in the environment. An ERA is a practice or methodology primarily developed by regulatory agencies to provide scientific input to decision makers. In this way, ERAs commonly serve as a supportive tool providing technical information in a manageable form to a larger EA.

**Heat Sink** A system or component that provides a path for heat transfer from a source, such as heat generated in the fuel, to a large heat-absorbing medium, such as water.

**Licensee** An individual or organization that is licensed to carry on a Licensed Activity.

**Loss-Of-Coolant Accident (LOCA)** A type of reactor accident that results from a loss of coolant due to a break in the primary heat transport system.

**Nuclear Facility (in the context of DNNP)** a nuclear fission or fusion reactor or subcritical nuclear assembly.

**Nuclear Power Plant** A nuclear facility consisting of any fission- reactor installation that has been constructed to generate electricity on a commercial scale.

**Offsite Power** alternating current (AC) power supplied from the transmission system (grid), to the plant electrical power distribution systems.

**Operating Experience (OPEX)** Pertinent internal and external information, gained through practical experience, used to learn about and improve the safety and reliability of nuclear facilities.

**Owner** OPG is the Darlington Nuclear Site Owner where the future DNNP Facility will be located. OPG is current licence holder for the DNNP Site Preparation Licence and will be the licence holder for the proposed Construction License.

**Pressure Boundary** A boundary of a pressure-retaining structure, system or component of a nuclear or non-nuclear system. Note: This definition applies to components subject to registration under applicable boiler and pressure vessel legislation.

**Probabilistic Safety Assessment (PSA)** A comprehensive and integrated assessment of the safety of a facility. 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 facility.

**Sievert (Sv)** The International System of Units (SI) unit of equivalent dose and effective dose, equal to 1 joule/kilogram.

## ACRONYMS

<b>AC</b>	Alternating Current
<b>ALARA</b>	As Low As Reasonably Achievable
<b>AOO</b>	Anticipated Operational Occurrences
<b>ASME</b>	American Society of Mechanical Engineers
<b>BDBA</b>	Beyond Design Basis Accident
<b>BEZ</b>	Break Exclusion Zone
<b>BIS</b>	Boron Injection System
<b>BWR</b>	Boiling Water Reactor
<b>CCS</b>	Containment Cooling System
<b>CDF</b>	Core Damage Frequency
<b>CEAA</b>	Canadian Environmental Assessment Agency
<b>CFD</b>	Condensate Filters and Demineralizers System
<b>CMD</b>	Commission Member Document
<b>CNSC</b>	Canadian Nuclear Safety Commission
<b>CRDH</b>	Control Rod Drive Hydraulic
<b>CWS</b>	Circulating Water System
<b>DBA</b>	Design Basis Accident
<b>DC</b>	Direct Current
<b>DCIS</b>	Distributed Control and Information System
<b>DEC</b>	Design Extension Condition
<b>DFO</b>	Department of Fisheries and Oceans Canada
<b>DGR</b>	Deep Geological Repository
<b>DIQ</b>	Design Information Questionnaire
<b>DL</b>	Defence Line
<b>DN</b>	Darlington Nuclear
<b>DNGS</b>	Darlington Nuclear Generating Station

<b>DNNP</b>	Darlington New Nuclear Project
<b>DPSC</b>	Diaphragm Plate Steel Composite
<b>DSA</b>	Deterministic Safety Analysis
<b>EA</b>	Environmental Assessment
<b>ECA</b>	Environmental Compliance Approval
<b>ECCC</b>	Environment and Climate Change Canada
<b>EcoRA</b>	Ecological Risk Assessment
<b>EDS</b>	Electrical Distribution System
<b>EIS</b>	Environmental Impact Statement
<b>EMEAF</b>	Environmental Monitoring and Environmental Assessment Follow-Up
<b>EMPP</b>	Environmental Management and Protection Plan
<b>EMS</b>	Environmental Management System
<b>ERA</b>	Environmental Risk Assessment
<b>ESA</b>	Endangered Species Act
<b>ESBWR</b>	Economic Simplified Boiling Water Reactor
<b>FFEE</b>	Fixed Face Earthen Embankment
<b>FFHE</b>	Functional Failure Hazards Evaluation
<b>FLEX/EME</b>	Flexible Mitigation Strategies or Emergency Mitigating Equipment
<b>FMCRD</b>	Fine Motion Control Rod Drive
<b>FMEA</b>	Failure Modes and Effects Analysis
<b>FPC</b>	Fuel Pool Cooling and Cleanup System
<b>FSF</b>	Fundamental Safety Function
<b>GEH</b>	General Electric Hitachi
<b>GT</b>	Gamma Thermometer
<b>HFE</b>	Human Factors Engineering
<b>HHRA</b>	Human Health Risk Assessment
<b>HSI</b>	Human-System Interface

<b>HX</b>	Heat Exchanger
<b>IAEA</b>	International Atomic Energy Agency
<b>ICS</b>	Isolation Condenser System
<b>INPO</b>	Institute of Nuclear Power Operations
<b>ION</b>	Indigenous Opportunities Network
<b>IPD</b>	Integrated Project Delivery
<b>ISO</b>	International Organization for Standardization
<b>ISRW</b>	Integrated Strategy for Radioactive Waste
<b>JRP</b>	Joint Review Panel
<b>L&amp;ILW</b>	Low and Intermediate Level Waste
<b>LOCA</b>	Loss of Coolant Accident
<b>LPRM</b>	Local Power Range Monitor
<b>LRF</b>	Large Release Frequency
<b>LTC</b>	Licence to Construct
<b>masl</b>	meters above sea level
<b>MCA</b>	Main Condenser and Auxiliaries
<b>MCR</b>	Main Control Room
<b>MECP</b>	Ministry of Environment, Conservation and Parks
<b>MNRF</b>	Ministry of Natural Resources and Forestry
<b>MW</b>	megawatts
<b>MWe</b>	megawatts electric
<b>MWth</b>	megawatts thermal
<b>NBS</b>	Nuclear Boiler System
<b>NMS</b>	Nuclear Management System
<b>NRC</b>	Nuclear Regulatory Commission
<b>NSCA</b>	Nuclear Safety and Control Act
<b>NWMO</b>	Nuclear Waste Management Organization

<b>OHSA</b>	Occupational Health and Safety Act
<b>OLCs</b>	Operating Limits and Conditions
<b>OPG</b>	Ontario Power Generation
<b>PCCS</b>	Passive Containment Cooling System
<b>PCS</b>	Primary Containment System
<b>PDP</b>	Preliminary Decommissioning Plan
<b>PEP</b>	Project Execution Plan
<b>PERA</b>	Predictive Environmental Risk Assessment
<b>PIE</b>	Postulated Initiating Event
<b>PIT</b>	Project Integration Team
<b>PLT</b>	Project Leadership Team
<b>PMT</b>	Program Management Team
<b>PPE</b>	Plant Parameter Envelope
<b>PRSL</b>	Power Reactor Site Preparation Licence
<b>PSA</b>	Probabilistic Safety Assessment
<b>PSAR</b>	Preliminary Safety Analysis Report
<b>RB</b>	Reactor Building
<b>REGDOC</b>	Regulatory Document
<b>RIV</b>	Reactor Isolation Valves
<b>RPV</b>	Reactor Pressure Vessel
<b>RWB</b>	Radwaste Building
<b>SA</b>	Severe Accident
<b>SARA</b>	Species at Risk Act
<b>SAT</b>	Systematic Approach to Training
<b>SCA</b>	Safety and Control Area
<b>SCCV</b>	Steel-Plate Composite Containment Vessel
<b>SCR</b>	Secondary Control Room



<b>SMR</b>	Small Modular Reactors
<b>SRF</b>	Small Release Frequency
<b>SSCs</b>	Structures, Systems and Components
<b>SSEMP</b>	Site-Specific Environmental Management Plan
<b>Sv</b>	Sievert
<b>TQD</b>	Training and Qualification Description
<b>WRNM</b>	Wide Range Neutron Monitor
<b>WTFN</b>	Williams Treaty First Nations

Enclosure 2 to OPG Letter, M. Knutson to D. Saumure, **“Notice of Participation at CNSC Public Hearing 2024-H-03 and Written Submission in support of the hearing on the application for the Darlington New Nuclear Project Construction Licence”**

**Enclosure 2**

**Darlington New Nuclear Project  
Indigenous Engagement Report  
November 2023 to May 2024  
NK054-REP-00531-10007  
June 2024**

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Title: **Darlington New Nuclear Project Indigenous Engagement Report November 2023 to May 2024**

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### Darlington New Nuclear Project Indigenous Engagement Report November 2023 to May 2024

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Prepared by:

Kenn Ross 2024-06-20  
Kenn Ross Date  
Sr Manager Indigenous  
Relations  
Ontario Power  
Generation

Approved by:

Katie Haddlesey 2024-06-25  
Katie Haddlesey Date  
Director, Indigenous  
Partnerships, Projects  
Ontario Power  
Generation

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Revision Summary

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## 1.0 IDENTIFIED INDIGENOUS NATIONS AND COMMUNITIES

The lands and waters on which the Darlington New Nuclear Project (DNNP) is situated are within the traditional and treaty territory of the Williams Treaties First Nations (WTFNs), which includes Curve Lake, Hiawatha, Alderville, the Mississaugas of Scugog Island, Chippewas of Beausoleil, Chippewas of Georgina Island and the Chippewas of Rama First Nations.

In 1923, the Chippewa First Nations and the Mississauga First Nations signed the Williams Treaties and together, over 90 years later in June 2018, these Nations joined to ensure that their rights to and the relationship with these lands is respected through a renewed agreement with Canada and the Province of Ontario.

Other Indigenous Nations and Communities which have expressed interest in the project or who have been identified for engagement by the Crown include Mohawks of the Bay of Quinte (MBQ), Métis Nation of Ontario Region 8 (MNO 8), Kawartha Nishnawbe, Six Nations of the Grand River, the Saugeen Ojibway Nation and the Huron Wendat. OPG is prepared to discuss the DNNP with any interested Indigenous Nation or Community.

OPG acknowledges the inherent, Aboriginal and treaty rights of Indigenous Nations and Communities as recognized in the *Constitution Act, 1982*. OPG's Indigenous Relations policy provides a framework for engaging with Indigenous peoples, advancing reconciliation and to report on the company's activities and progress in achieving established goals.

The purpose of this Indigenous Engagement Report (IER) is to document Indigenous engagement activities related to DNNP, to track issues and concerns raised, as well as steps OPG has taken to minimize impacts or to address raised issues. This report is prepared in accordance with REGDOC-3.2.2, Indigenous Engagement.

OPG's objective with respect to engagement with interested Indigenous Nations and Communities is to share information on DNNP, understand concerns and potential impacts to Aboriginal and treaty rights, promote dialogue and create collaborative opportunities for participation in the development, implementation, and review of mitigation measures. This engagement is built upon a relationship of trust and respect in order to be meaningful.

OPG has offered capacity funding agreements to all the WTFNs. To date agreements are in place with Curve Lake, Mississaugas of Scugog Island, Hiawatha and Alderville First Nations. Capacity funding has also been provided to other Indigenous communities based on submitted costs and expenses, such as the Métis Nation of Ontario Region 8.

The Indigenous Nations and communities included in the IER are listed in Table 1.

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**Table 1: Indigenous Nations and communities Included in OPG Indigenous Engagement Program Related to DNNP**

Indigenous Nation or Community	Treaties Covering DNNP Lands	Affiliation	Cultural Group	Methodology & Rationale
Mississaugas of Scugog Island FN Williams Treaties First Nations (WTFN)	<ul style="list-style-type: none"> <li>Johnson-Butler Purchase/Gunshot Treaty (1787-88)</li> <li>The Williams Treaties (1923)</li> </ul>	Anishnabek Nation	Mississauga	<ul style="list-style-type: none"> <li>Community is approximately 37 km from site.</li> <li>Rights holder.</li> <li>DNNP is within traditional and treaty territory.</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Alderville FN Williams Treaties First Nations (WTFN)	<ul style="list-style-type: none"> <li>Johnson-Butler Purchase/Gunshot Treaty (1787-88)</li> <li>The Williams Treaties (1923)</li> </ul>	Anishnabek Nation	Mississauga	<ul style="list-style-type: none"> <li>Community is approximately 75 km from site.</li> <li>Rights holder.</li> <li>DNNP is within traditional and treaty territory.</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Hiawatha FN Williams Treaties First Nations (WTFN)	<ul style="list-style-type: none"> <li>Johnson-Butler Purchase/Gunshot Treaty (1787-88)</li> <li>The Williams Treaties (1923)</li> </ul>	Assoc. of Iroquois and Allied Indians (AIAI)	Mississauga	<ul style="list-style-type: none"> <li>Community is approximately 75 km from site.</li> <li>Rights holder.</li> <li>DNNP is within traditional and treaty territory.</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Curve Lake FN Williams Treaties First Nations (WTFN)	<ul style="list-style-type: none"> <li>Johnson-Butler Purchase/Gunshot Treaty (1787-88)</li> <li>The Williams Treaties (1923)</li> </ul>	Anishnabek Nation	Mississauga	<ul style="list-style-type: none"> <li>Community is approximately 100 km from site.</li> <li>Rights holder.</li> <li>DNNP is within traditional and treaty territory.</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Chippewas of Georgina Island FN Williams Treaties First Nations (WTFN)	The Williams Treaties (1923)	Anishnabek Nation	Chippewa	<ul style="list-style-type: none"> <li>Community is approximately 95 km from site.</li> <li>Rights holder.</li> <li>DNNP is within traditional and treaty territory.</li> <li>Ministry of Energy delegation via letter.</li> </ul>

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Indigenous Nation or Community	Treaties Covering DNNP Lands	Affiliation	Cultural Group	Methodology & Rationale
Chippewas of Rama FN Williams Treaties First Nations (WTFN)	The Williams Treaties (1923)	Anishnabek Nation	Chippewa	<ul style="list-style-type: none"> <li>Community is approximately 120 km from site.</li> <li>Rights holder.</li> <li>DNNP is within traditional and treaty territory.</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Beausoleil FN Williams Treaties First Nations (WTFN)	The Williams Treaties (1923)	Anishnabek Nation	Chippewa	<ul style="list-style-type: none"> <li>Community is approximately 210 km from site.</li> <li>Rights holder.</li> <li>DNNP is within traditional and treaty territory.</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Huron-Wendat Nation	N/A	Assembly of First Nations Quebec-Labrador	Huron	<ul style="list-style-type: none"> <li>Community is located in Quebec.</li> <li>Traditional territory spans from southeast Georgian Bay to St. Lawrence seaway.</li> <li>Ministry of Energy delegation via letter – interests are specific to archaeological resources.</li> </ul>
Mohawks of the Bay of Quinte	N/A	Association of Iroquois and Allied Indians (AIAI)	Haudenosaunee	<ul style="list-style-type: none"> <li>Community is located approximately 140 km from site – near Belleville.</li> <li>Expressed interests in the project. Interest in water rights (Lake Ontario).</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Kawartha Nishnawbe	N/A		Mississauga	<ul style="list-style-type: none"> <li>Community is located approximately 90 km from site – near Burleigh Falls.</li> <li>DNNP is in process of learning this Community's interests in the project.</li> </ul>



**Title:**  
**Darlington New Nuclear Project Indigenous Engagement Report November 2023 to May 2024**

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Indigenous Nation or Community	Treaties Covering DNNP Lands	Affiliation	Cultural Group	Methodology & Rationale
				<ul style="list-style-type: none"> <li>Ministry of Energy delegation via letter.</li> </ul>
Métis Nation of Ontario Region 8	N/A	Métis Nation of Ontario	Métis	<ul style="list-style-type: none"> <li>Representation covers Durham, Toronto, York, Mississauga, Peel, and Halton.</li> <li>Expressed interests in the project.</li> <li>Ministry of Energy delegation via letter.</li> </ul>
Six Nations of the Grand River	N/A	These nations are the Mohawk, Cayuga, Onondaga, Oneida, Seneca and Tuscarora.	Haudenosaunee	<ul style="list-style-type: none"> <li>Community is located on the Grand River near Brantford Ontario.</li> <li>CNSC has recommended OPG offer updates on the project to this Community.</li> </ul>
Saugeen Ojibway Nation (SON)	N/A	Chippewas of Nawash Unceded First Nation and Saugeen First Nation are independent/unaffiliated First Nations. Nawash and Saugeen created a joint council known as the SON (Saugeen Ojibway Nation).	Chippewa	<ul style="list-style-type: none"> <li>Community is located at the Saugeen River and Bruce Peninsula.</li> <li>A key area of interest is waste transportation and storage at OPG's Western Waste site at Bruce. Engagement is led by OPG's IR and NSS groups, supported by DNNP.</li> </ul>

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## 2.0 SUMMARY OF ENGAGEMENT ACTIVITIES NOVEMBER 2023 – MAY 2024

Highlights for this reporting period include themes related to key issues and concerns Indigenous Nations and Communities have raised and the commitments and/or mitigation measures OPG is making to address them and the status/next steps as below in Table 2.

**Table 2: Themes and Key Issues for the Reporting Period**

Issue/Concern	Commitment/Mitigation	Next Steps
Cumulative Effects Study, Rights Impact Assessment, Analysis between 2009 EA and current standard.	These issues will be addressed and actioned in collaboration with the Indigenous Knowledge Study (IKS) organized by WTFN and funded by OPG. An environment sub-committee has been proposed and accepted by the Nations which would focus on understanding the actions required to meet current standards.	Currently, the scoping of these activities is with the WTFN members of Mississaugas of Scugog Island, Curve Lake, Hiawatha and Alderville First Nations. OPG will be working with these Nations on next steps.
Environmental concerns, monitoring participation and protection of species on-site.	An Environmental Monitoring Augmentation Plan (EMAP) have been proposed which would apply an Indigenous lens to existing monitoring activities. This would fall under the proposed Environment Sub-committee.	The planned (IKS), continued engagement and consultation respective to environmental topics, and collaboration on offsetting and restoration planning will inform the approach to augmented environmental monitoring planning for OPG sites.  The proposed EMAP is being developed collaboratively with WTFN with a target implementation time frame of 2027.
Permitting	OPG dedicates a formal meeting per month on permitting requirements. In addition to presentations on subject matter, questions from Indigenous Nations and Communities concerning the various permits are dispositioned outside of the meeting framework.	OPG will continue with the dedicated permit meetings mindful that WTFN has asked that permits and other project subject matter have their context to the whole of the project communicated versus piecemeal.
Climate Change	WTFN and other Indigenous Nations and Communities have identified	The required CNSC documentation with WTFN input was filed on May

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	<p>climate change as a key concern regarding SMR development.</p> <p>OPG has engaged with Indigenous Nations and Communities on its climate change plans for the SMR. Additionally, OPG has dispositioned questions and comments from WTFN regarding its Phase 1 and 2 planning documents prior to CNSC submission to obtain and incorporate feedback.</p>	<p>31. OPG will continue to engage WTFN and other Interested Nations and Communities on OPG climate change plans as they pertain to the DNNP.</p>
Stormwater Management	<p>As related to permitting on this subject, OPG is engaged in receiving ongoing feedback/input from WTFN on SWM planning.</p>	<p>DNNP Stormwater Management is a semi-regular agenda topic during Monthly and Permit meetings, as amendments and approvals are sought engagement occurs to receive direct feedback on designs and mitigations.</p>
Shoreline Protection	<p>Engagement and consultation regarding the planning, design and permitting for the Shoreline Protection. Key topics include potential terrestrial and aquatic impacts, design integrity, and potential impacts to Bank Swallows and other species.</p>	<p>To advance this engagement, the Mississaugas of Scugog Island First Nation with OPG funding support has undertaken a third-party review as of May 2024. The purpose of the review is to determine the overall soundness of the design and opportunities for habitat creation and aquatic compensation.</p> <p>Continued engagement and consultation respective to designs and permitting/approvals; during standing permit and monthly meetings</p>
CCW and lake temperature	<p>Engagement and consultation regarding the planning, design and permitting for the Condensate Cooling Water (CCW) system; specific discussions to be had on potential impacts to the lake temperature and aquatic environment; mitigating potential</p>	<p>DNNP CCW and Shoreline Protection remain a focus of discussion and consultation throughout 2024; discussed at both the monthly meetings and permitting meetings.</p>

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	impacts to lake and water temperatures	
Interim waste storage and related waste topics.	<p>Engagement regarding the planned interim storage of intermediate and low waste at the SMR site and long-term plans for the used fuel produced are ongoing.</p> <p>In order to better address issues and concerns centred on waste issues, OPG has developed a waste meeting table as an adjunct to the regularly planned meetings with WTFN. OPG will discuss waste issues with any Indigenous Nation and Community making such a request.</p>	<p>The engagement and consultation table regarding waste topics launching in June/July 2024.</p> <p>Including representation from the WTFNs, and members of OPG Indigenous Relations, Nuclear Sustainability Services and Decommissioning, and other required SMEs.</p>
Ceremony	WTFN has asked that ceremony be incorporated into the SMR project, and this has begun, e.g., tree ceremony in December 2023 ahead of clearing.	The project continues to look for ceremony opportunities. A tree ceremony was conducted ahead of clearing work on site in December 2023 and a water ceremony is being planned.
Offsetting and Restoration plans	<p>Planning discussions with WTFN and other Indigenous Nations and Communities on offsetting and restoration plans are ongoing e.g., Beneficial Action Areas on and off site, aquatic and terrestrial restoration while incorporating IKS.</p> <p>To advance these plans, OPG and WTFN are meeting beyond the permitting and monthly project meetings to engage and consult in depth.</p>	<p>It was agreed in October 2023 that OPG and WTFN would meet quarterly to undertake offsetting and restoration plans on a quarterly basis. The first meeting was held in June 2024 and the series will help to inform the IKS.</p> <p>A workshop is being held on June 11 in MSIFN to undergo a mapping activity that will create a space for collaborative identification of potential offsets and restoration areas.</p>
Internal Training	Responding to a request in May 2023 from WTFN, the SMR project has undertaken internal Indigenous training for all project staff (OPG, GE, AECON, AtkinsRealis) to better understand Indigenous history and	As of June 2024, 55% of DNNP project staff have successfully completed the IR 101 Training; additional sessions are scheduled

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	culture with an emphasis on WTFN and the 2018 Settlement Agreement. The tiered training includes IR 101, Duty to Consult Lunch and Learns and the 'Just Get Over It' workshop offered through the First Peoples House of Learning at Trent University.	for June, August, September, October and November of 2024.
Project Agreement	MSIFN has asked OPG to consider entering into a project agreement for DNNP	MSIFN has provided a draft project agreement, the Indigenous Relations and Partnership team at OPG have completed an initial review and a follow up meeting is planned for June 20 <sup>th</sup> .

Table 3 below provides an update on engagement activities for the period of March 2023 to November 2024.



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Table 3: OPG Engagement Log for Identified Indigenous Nations and Communities

DNNP Engagement Log November 2023—May 2024

Date	Community	Activity	Discussion Topics	Additional Information	Issues Raised
November 2, 2023	<ul style="list-style-type: none"><li>Curve Lake First Nation</li></ul>	Trades Caree Fair	DNNP related career opportunities through the trades.	Event focused on youth.	N/A
November 8, 2023	<ul style="list-style-type: none"><li>Georgina Island First Nation</li></ul>	Trades Career Fair	DNNP related career opportunities through the trades.	Event focused on youth.	N/A
November 20, 2023	<ul style="list-style-type: none"><li>Chippewas of Rama First Nation</li></ul>	OPG Indigenous Relations meeting with Rama FN Chief and Council	Discussed a high-level overview of the DNNP, DNGS, PNGS and ION	Meeting took place in Rama FN; OPG Indigenous Relations staff present including VP.	N/A
November 22, 2023	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Métis Nation of Ontario Region 8</li><li>Saugeen Ojibway Nation</li></ul>	Receipt of Interventions from Nation and Indigenous Nations and Communities via CNSC.	N/A	OPG IR and DNNP staff to review in preparation for January 2024 EA/EIS Hearing, LTC #1.	See CNSC website for copies of intervention. <a href="https://nuclearsafety.gc.ca/eng/the-commission/hearings/cmd/index.cfm#hearing-202401">https://nuclearsafety.gc.ca/eng/the-commission/hearings/cmd/index.cfm#hearing-202401</a>
November 23, 2023	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Tour of DWMF and site work for Building 3.  Presentation by Nuclear Sustainability Services.	Presentation focused on: <ul style="list-style-type: none"><li>Used fuel storage at site related to DNNP.</li><li>Disposition of L&amp;ILW</li><li>Integrated Strategy on Radioactive Waste (NWMO)</li></ul>	Only reps from Curve Lake and Mississaugas of Scugog Island were available for the tour.  Reps requested that technical information be rendered in plain language as much as possible; even more so when engaging Nation citizens.  Reps noted it is important what waste is not as much as what it is.	Volume of used fuel dry cells needed for 60 years of operations.  Fuel type and timeline for approval.  Interim storage.  Licensing for waste operations.  Used fuel DGR and final disposition of SMR L&ILW.
December 6, 2023	<ul style="list-style-type: none"><li>Curve Lake First Nation</li></ul>	CLFN Quarterly harvester’s symposium.	DNNP, ION, Nuclear Waste/By-products, DNGs and PNGS	OPG operated an information booth at this community event, to engage with CLFN community members	N/A
December 7, 2023	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li></ul>	Michi Saagiig led Ceremony prior to clearing and grubbing activity at the DNNP Site.		WTFN had requested increased role of ceremony in DNNP project.	N/A



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December 8, 2023	<ul style="list-style-type: none"><li>Mohawks of the Bay of Quinte</li></ul>	Emails to consultation representatives regarding DWMF/NSS update meetings in Q1—seeking dates.	Proposed topics: <ul style="list-style-type: none"><li>Used fuel storage at site related to DNNP.</li><li>Disposition of L&amp;ILW</li><li>Integrated Strategy on Radioactive Waste (NWMO)</li></ul>	Final agenda topics to be determined in consultation with reps.	Meeting date to be determined.
December 8, 2023	<ul style="list-style-type: none"><li>Métis Nation of Ontario Region 8</li></ul>	Emails to consultation representatives regarding DWMF/NSS update meetings in Q1—seeking dates.	Proposed topics: <ul style="list-style-type: none"><li>Used fuel storage at site related to DNNP.</li><li>Disposition of L&amp;ILW</li><li>Integrated Strategy on Radioactive Waste (NWMO)</li></ul>	Final agenda topics to be determined with consultation reps.	See log entry for April 16/24.
December 20, 2023	<ul style="list-style-type: none"><li>Curve Lake First Nation</li></ul>	Email: Response to Curve Lake FN representatives RE: Question from CLFN Consultation Committee	DNNP, Effluents/Releases, Environmental Monitoring	A question was raised while OPG presented/attended a CLFN Consultation Committee meeting in September 2023. The question was responded to by SME's working on plant design for DNNP.	<ul style="list-style-type: none"><li>What would be considered “non-normal” operations at the DNNP?</li><li>Are potential releases in non-normal scenarios known/analyzed?</li></ul>
January 10, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li></ul>	Cultural and Consultation staff engagement with Admin Bldg and Corp HR project teams.	Cultural design inputs to buildings. E.g., water, trees motif; mound sculptures, medicine garden.	Follow-up meeting in Hiawatha FN in Feb/24.	Important to accommodate smudging as a must-have in both buildings.
January 10, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Notification sent to the Mississauga WTFN communities that the following permit applications and supporting materials are available for review and comment in the SharePoint site.	DNNP, Stormwater Management, Permit to Take Water (PTTW), Environmental Compliance Approval (ECA), Endangered Species Act (ESA), Provincial/Federal Permitting	Notification was provided to the Mississauga WTFN communities that the permit applications and supporting documents for the ESA, ECA and PTTW permits/approvals were available for review/comment in the OPG/WTFN SharePoint site	N/A
January 18, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Materials were sent to the Mississauga WTFNs to support the January 18 <sup>th</sup> DNNP Permit Meeting, supporting LTC	<ul style="list-style-type: none"><li>ESA (Endangered Species Act) Permit</li><li>PTTW (Permit to Take Water) Overall DNNP</li><li>Stormwater Management ECA (Environmental Compliance Approval) Amendment</li></ul>	Email correspondence sent, included the materials to support the DNNP/WTFN permit meeting	N/A



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January 18, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Meeting regarding three permits in support of LTC.	<ul style="list-style-type: none"><li>ESA (Endangered Species Act) Permit</li><li>PTTW (Permit to Take Water) Overall DNNP</li><li>Stormwater Management ECA (Environmental Compliance Approval) Amendment</li></ul>	<p>Nation recommended OPG consider ‘maximal impacts’ to cover various permits wholistically vs silo of consideration per permit.</p> <p>Include cultural keystone species in studies, not just ones from ESA list.</p> <p>Nation expects to be kept up to date on OPG’s climate change plans for the SMR and methodologies of studies.</p>	<p>ESA: Updated engagement plan will be shared for review with Nation.</p> <p>Hydro One corridors and restoration—separate meeting on this between Hydro One, OPG and Nation. Map need to update corridor.</p> <p>Meeting with CLOCA on habitat, etc., to be scheduled.</p> <p>Meeting on bank swallows habitat and nesting and bat foraging/roosting on adjacent lands recommended.</p> <p>PTTW: Question on where water flow goes answered: monitoring plans to include quality and treatment plan (if required). Discharge plan will be shared.</p> <p>While radiological contamination in water has not been detected, Nation expect this monitoring will be ongoing.</p> <p>Although no livestock contamination has been detected, Nation OPG will monitor for possible pathways of contaminants over time.</p> <p>Stormwater Management: Management systems to be reviewed for performance and maintenance, including natural features such as swales.</p> <p>OPG confirmed that the CCW was designed with the potential for all 4 reactors in mind.</p> <p>Nation would like to know if alternative locations for CCW were considered and the plans to respond to a failure in the system.</p> <p>Overall: protocol needed to ensure contractors engage with OPG on IR aspects of project/permits vs Nation directly.</p>
January 30, 2024	<ul style="list-style-type: none"><li>Métis Nation of Ontario Region 8</li></ul>	Virtual meeting.	<ul style="list-style-type: none"><li>DNNP</li><li>PNGS Refurb</li></ul>	Introductory call, new nuclear consultation co-ordinator for MNO.	Discuss aimed at setting meeting in Q1 with MNO nuclear co-ordinator and regional consultation committee.
January 31, 2024	<ul style="list-style-type: none"><li>Alderville First Nation</li></ul>	Virtual meeting.	Draft Capacity Agreement discussion.	Series of meetings to finalize financial capacity for Alderville First Nation.	Upon conclusion of this agreement, all four Mississauga WTFN members will have agreements in place.
February 9, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Meeting Materials sent to the Mississauga WTFNs to support the February 15 <sup>th</sup> /2024 DNNP Permit Meeting	<ul style="list-style-type: none"><li>DNNP</li><li>CCW</li><li>Shoreline Protection</li><li>Provincial/Federal Permitting</li></ul>	Meeting materials were emailed to representatives of the four Mississauga WTFN communities. Materials are to support discussions during the February 15 <sup>th</sup> /2024 DNNP/WTFN Permit Meeting	N/A
February 14, 2024	<ul style="list-style-type: none"><li>Chippewas of Rama First Nation</li></ul>	In-person introductory meeting with Chief, council	<ul style="list-style-type: none"><li>OPG Overview</li></ul>	Request for information on DNGS 30-year license and	Discussion on disposition of waste (on-site and transported); how 10-year water cooling for used fuel was determined.





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		and representatives and DNGS Site Tour	<ul style="list-style-type: none"><li>DNNP Update re LTC</li><li>PNGS Refurb/Decommissioning</li><li>Nuclear Sustainability Services (waste)</li><li>DNGS Tour</li></ul>	PNGS Indigenous engagement plan; previously sent but staff change at Rama FN has impacted response time. (Sent again this date.)	<p>Supply Chain categories for Indigenous business; OPG to provide this information and set up possible meeting.</p> <p>2009 EA and its relation to 2018 WTFN Settlement and current environmental standards (to be addressed via planned Indigenous Knowledge Study).</p> <p>Interest in potential sites for new nuclear development and DGR for waste.</p>
February 15, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	WTFN meeting regarding two permits in support of DNNP LTC, and introductory meeting for engagement required for Pickering Nuclear Generating Station (decommissioning and refurbishment, first steps)	<ul style="list-style-type: none"><li>CCW System</li><li>Shoreline Protection</li><li>Thermal Effects Assessment</li><li>Non-Thermal Effects</li><li>Offsetting</li><li>PNGS</li></ul>	Recommended by 4 Directions that PNGS include Regional Water Source Protection among Ministries/agencies for permits and notifications. Concerns re: private well water, livestock water, etc.	<p>CCW: Nations asked to see permits for this and they will be provided in Q2.</p> <p>A meeting to review the marine archaeological reports was requested and will be set up in March.</p> <p>Question re: temperature of water once defused; 2 degrees higher vs 10 of DNGS, smaller overall plume. Nations to receive Receiving Water and Thermal effects reports.</p> <p>Shoreline Protection: concerns expressed re: armourstone revetment and impacts to habitat and food web, e.g., temperature increases. Offsetting needed on lake local to area to replenish species versus financial compensation. Planned restoration meetings and Indigenous Knowledge Study will inform actions.</p> <p>Thermal Effects Assessment: Plankton and invertebrate to be included in study.</p> <p>Question regarding climate change data being used: OPG data on Great Lakes to 2100 AD being used in modelling.</p> <p>Non-Thermal Effects Assessment: Study re: fish entrainment and impingements and how to reduce these impacts. Impacts to Aboriginal and treaty rights need to be part of this, e.g., offsets may need to be more than 1:1. 4 Directions has concepts re: enhanced monitoring over a 7-to-10-year period.</p> <p>Offsetting: Initial discussion to set expectations, subject to be discussed in more depth on February 22 meeting. Need to understand zone of impact and how Knowledge Study will inform offsetting plan.</p> <p>PNGS: overview of plan new deep-water intake to reduce fish impingement and entrainment, permits and notifications required.</p>
February 16, 2024	<ul style="list-style-type: none"><li>4 Directions Consultants (Curve Lake/Hiawatha First Nations)</li></ul>	eDNA sampling, Butternut tree at DNNP site.	N/A	On-site activity.	N/A



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February 16, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email	<ul style="list-style-type: none"><li>ESA</li><li>Federal/Provincial Permitting</li></ul>	Email response from representatives at MSIFN. Response included comments/feedback from MSIFN on the DNNP's ESA Permit Application to support SMR Units 2, 3, 4 Site Preparation	N/A
February 21, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	<ul style="list-style-type: none"><li>Environmental Risk Assessments</li><li>Federal/Provincial Permitting</li><li>Indigenous Knowledge Study</li></ul>	Email sent to the Mississauga WTFNs that included the meeting materials to support the February 22 <sup>nd</sup> , 2024, DNNP/WTFN Monthly Meeting	N/A
February 22, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	WTFN Monthly Meeting	<ul style="list-style-type: none"><li>Action Items Review, Jan 18 &amp; Feb 15</li><li>2024 Roadmap</li><li>Quarterly Restoration meetings</li><li>Permits in support of LTC</li><li>Environmental Risk Assessment (ERA)</li></ul>	<p>There was also discussion re: impacts to roosting and foraging habitat: OPG needs to replace habitat as it clears and avoid long gaps in taking action for the birds and bats affected.</p> <p>Two butternut trees at Site will be stored for pick up and use by CLFN and HFN.</p>	<p>Action Items. Reviewed and updated. Several in process. Marine Archaeological review tentatively set for March 13.</p> <p>2024 Road Map: Consensus was that the roadmap is a good structure. The Indigenous Knowledge Study (IKS) is a part of this, and the nations will meet to discuss best approach among themselves and report back to OPG. Desire to see where all OPG assets are in WTFN treaty/traditional lands. CLFN and MSIFN have in-house IKS knowledge which can be utilized.</p> <p>Restoration: Meetings planned in April, July and Oct. Effort will be to meeting in the communities for these.</p> <p>Permits: Status discussed. WTFN to review high priority vs low and determine attention required to low items.</p> <p>ERA: The SMR development has accelerated this 5-year process. Process began in Jan/24 and WTFN has an opportunity to participate. To date studies have indicated negligible radiological released to the environment. Role of receptors discussed: OPG open to adding valued ecological components based on WTFN feedback. There may also be a tie between the ERA and the planned IKS.</p>
February 22, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Response the WTFNs RE: DNNP Site watercourse flow rates	<ul style="list-style-type: none"><li>Stormwater Management</li><li>Environmental Monitoring</li><li>Federal/Provincial Permitting</li></ul>	A request was made at the January 18 <sup>th</sup> /2024 DNNP/WTFN Permit Meeting to receive detailed information regarding the pre- and post-development flow rates at the DNNP site	N/A
February 23, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li></ul>	Email: Distribution of Draft Site-Specific Environmental Management Plan (SSEMP)	<ul style="list-style-type: none"><li>Environmental Monitoring</li><li>Site Preparation</li><li></li></ul>	Email distribution of the DNNP SSEMP supporting SMR Units 2, 3, 4 Site Preparation. Draft	N/A

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Title:  
Darlington New Nuclear Project Indigenous Engagement Report November 2023 to May 2024

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	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>			was sent to WTFN communities for review/comment	
February 23, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: DNNP Responses to MSIFN ESA Comments/Feedback	<ul style="list-style-type: none"><li>Endangered Species Act</li><li>Federal/Provincial Permitting</li></ul>	Email was sent to MSIFN responding to their comments and feedback on the ESA Permit Application supporting Site Preparation for SMR Units 2, 3, 4	N/A
March 5, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li></ul>	Email: HFN Comments/Feedback for ESA, PTTW and SWM ECA Permit/Approval Applications	<ul style="list-style-type: none"><li>Endangered Species Act</li><li>Stormwater Management</li><li>Environmental Compliance Approval</li><li>Permit to Take Water</li><li>Federal/Provincial Permitting</li><li>Site Preparation</li></ul>	Email was received from HFN representatives, the email included comments and feedback from HFN on the DNNP Permit/Approval applications for Stormwater Management ECA, ESA (Site Preparation Units 2-4), and the Permit to Take Water	N/A
March 11, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: Status Update on MSIFN Permit/Approval Application Reviews	<ul style="list-style-type: none"><li>Endangered Species Act</li><li>Stormwater Management</li><li>Environmental Compliance Approval</li><li>Permit to Take Water</li><li>Federal/Provincial Permitting</li><li>Site Preparation</li></ul>	Response from MSIFN on the status of permit and/or approval application reviews for ESA, SWM ECA, and PTTW.	N/A
March 13, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Requested meeting re: marine archaeology update at DNNP site related to LTC.	<ul style="list-style-type: none"><li>Any new Indigenous artifact findings</li><li>Chance finds protocol</li><li>Use of tunnels vs pipes for cooling</li><li>Report submission status to MECP</li><li>Soil disturbance at point of entry for cooling (from shore)</li></ul>		Requested for a summary document based on previous reports and key actions taken and any work outstanding. To be illustrated with news maps.
March 13, 2024	<ul style="list-style-type: none"><li>Métis Nation of Ontario Region 8</li></ul>	Quarterly meeting with MNO 8 Representatives.	Review of EIS Hearing Intervention topics plus NSS overview:	Follow-Up Actions: OPG to arrange a call with MNO 8 staff to discuss monitoring schedule and opportunities.	Status of Sites 1, 2, 3, 4: Question regarding the clearing of trees, plants and overall habitat. As part of the Endanger Species Act permit from the provincial Ministry of the Environment, OPG is obligated to mitigate and offset intrusive work which



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			<ul style="list-style-type: none"><li>• Status of Sites 1, 2, 3, 4 re: LTC</li><li>• Archaeological protocol</li><li>• Supporting docs re: environmental impacts to ponds, wetland, fish</li><li>• Update on bank swallows</li><li>• Climate change planning and SMR development re: LTC</li><li>• EA vs EIS socio-economic finding, e.g., less procurement and workforce</li><li>• NSS overview.</li></ul>	<p>The above call to also provide update regarding Provincial vs Federal EAs at the site.</p>	<p>may disturb the natural environment, i.e., Beneficial Action Areas. Restorative plans are still formulated.</p> <p>Related question concerning heritage features on and off the Darlington site. OPG explained that there are several wildlife corridors to promote the movement of species, e.g., bats, and a long-term enhancement plan is also being formulated.</p> <p>Archaeological protocol: OPG and its vendors operate a chance find protocol with key training for supervisory staff. In the event an Indigenous artifact is uncovered, work will cease in that area to assess the find. Should the artifact be Indigenous, local Indigenous communities will be notified and the provincial archaeological protocols will be followed. OPG will work with Indigenous Community monitors as circumstances dictate.</p> <p>Supporting documents re: environmental impacts to ponds, wetland, fish: Supporting documents on this subject was emailed to MNO 8 on December 15, 2023. MNO 8 expressed an interest in OPG's current monitoring regime, which is continuous to ensure radiological safety and the integrity of the natural environment. An annual report is also posted on the OPG website. MNO 8 expressed interest in monitoring as well.</p> <p>Update on bank swallows: Original DNNP plan was for four large reactors which would have impacted the bluffs used as habitat by the bank swallows. In response OPG has been testing an artificial structure to mimic the habitat used by bank swallows. Currently the testing is in year 3 of 7 and the data so far is favorable. The SMR development presents a smaller footprint which should avoid direct impacts to the bluffs. Planning will continue to be prepared to accommodate the species should it become necessary.</p> <p>Drainage and climate change planning for SMR development: It was noted that the smaller SMR footprint is beneficial regarding site drainage, the amount of which will be less than originally planned. MNO 8 asked about effluent and OPG explained that the SMR unit is designed to emit zero effluent. Excess water from the site would be returned to Lake Ontario and will not be treated chemically to avoid trace contaminants. The cooling system was also discussed, and it was clarified that while lake water will cool the SMR, the water will not be radioactive. A question was raised about any pollutants from the SMR being introduced into the lake and an example from Darlington came up; occasionally Styrofoam balls used to clean the pipes in place of chemical can flow into the lake, though OPG does look to collect such samples.</p> <p>Climate change planning is based on past date specific to the area of the SMR and future projects based on third-party scientific data. Factors such as temperature and rainfall are factored into a robust, long-term plan spanning</p>
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					<p>decades. OPG’s planning is centered around operating the SMR in a variety of scenarios safely and this planning is true of all OPG assets.</p> <p>EA vs EIS socio-economic finding, e.g., less procurement and workforce: It was noted that the original EA was written with Darlington B in mind, i.e., 4 large reactors, while the EIS envisioned a single SMR. However, now that OPG is planning on four SMRs, the gap between the two will decrease. There will in fact be robust requirements material procurement and workforce during the construction phase, while the operational staff of the final reactors will be less than a Darlington A. As always, OPG is pleased to discuss its Indigenous procurement and staff initiatives with MNO 8 and the other Regions.</p> <p>NSS overview: A question was raised by MNO 8 to clarify numbers discussed in the presentation: 112 containers of waste are projected from 4 SMR units over a period of 60 years. Also, the location of storage units will not be proximate to existing or restored habitat areas. The used fuel will be stored on site until such a time as a deep geological repository (DGR) is approved. This work is being undertaken by the Nuclear Waste Management Organization, which has undertaken a host Community siting process; Indigenous Nations and Communities are included in this process. Low to intermediate waste will be processed off-site by a vendor, which has not been decided. Overall, OPG will be working to reduce the amount of nuclear waste it produces based on proven practices undertaken at the Western Waste Site.</p> <p>Radiological properties in the air, soil and water from the SMR were raised as a concern by MNO 8; OPG monitors these factors and others (e.g., food sampling) on a continuous basis to ensure safety for the environment and public.</p>
March 11-14 2023	N/A	OPG Information Booth at LNHL Indigenous Youth Hockey Tournament	OPG Nuclear, OPG RG, ION, Business and Procurement Opportunities, OPG RAP	OPG had a large corporate information sharing booth at this year’s LNHL to promote dialogue and connection with various First Nations and Indigenous peoples from across Ontario; event took place in Markham, Ontario.	N/A
March 15, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Meeting Materials sent to the Mississauga WTFNs for upcoming March 21 <sup>st</sup> DNNP Monthly Meeting	<ul style="list-style-type: none"><li>- DNNP</li><li>- Environmental Compliance Approval</li><li>- Soil Containment Structure/Soil Spoils Pile</li><li>- MNRF Work Permit for Geotechnical Drilling</li><li>- Federal/Provincial Permitting</li></ul>	Email was sent to the Mississauga WTFN communities which included the presentation and supporting materials for the March 21 <sup>st</sup> /2024 DNNP/WTFN Permit Meeting	N/A

March 18, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li></ul>	Engagement re: Indigenous design elements for planned SMR admin building.	Meeting in Nation re: appropriate incorporation of Mississauga specific cultural attributes to building design and landscape architecture.	Meeting took place in Hiawatha First Nation	N/A
March 18, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li></ul>	Email: Request for CLFN to identify availability for a follow-up meeting	<ul style="list-style-type: none"><li>DNNP Administration Building Design &amp; Architecture</li></ul>	Email was sent to representatives of CLFN to identify potential availability for a follow up meeting to discuss the DNNP Administration Building Architecture and Design	N/A
March 18, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Phase 1 & 2 Climate Change Risk Assessment in support of LTC.	<ul style="list-style-type: none"><li>DNNP</li><li>Climate Change Risk Assessment Process</li></ul>	Request that the WTFN Nations review/comment on the Phases 1 and 2 draft for May 31/2024.	N/A
March 19, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: DNNP Shoreline Protection 70% Design Report for WTFN Review	<ul style="list-style-type: none"><li>DNNP</li><li>Shoreline Protection</li></ul>	Email was sent to the Mississauga WTFNs to notify them that the 70% Design Report for DNNP Shoreline Protection is available in the SharePoint for review and comment.	N/A
March 21, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Monthly permit meeting.	<ul style="list-style-type: none"><li>ECA (Environmental Compliance Approval) Application for DNNP Soil Containment Structure SWM Pond/Holt Road Widening re: LTC.</li><li>MNRF Work Permit - In-Water Works for Borehole Drilling/Geotechnical investigate work for the CCW Loop Tunnel as per LTC.</li><li>Indigenous Knowledge Study (IKS) status</li></ul>		<p>ECA: Quantify 4 million sq m pile: larger than a football field and 30 m high. End of additions to piled in 2025. Plants species to help with low level contaminants recommended by WTFN re: seeding. Indigenous contractor assisting with native species selection.</p> <p>Water quality monitored? Yes. Not a drinking source.</p> <p>Soil was pretested before movement re contaminants.</p> <p>To share monitoring plan with WTFN. ESA required. Soils pile area will not cross over to beneficial action areas.</p> <p>MNRF work permit, boreholes: third-part review document shared again, comments still possible from WTFN. Work planned for mid-2025.</p> <p>Crown land purchase with MNRF subject to review by WTFN re: 2018 settlement and rights. Meeting to engage on this topic in April.</p>



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					<p>IKS: WTFN to meet on own April 2<sup>nd</sup> to discuss 5-year framework and budget, use of independent consultant, access to additional CNSC funds.</p> <p>Consider 2009 EA standards compared to 2024 and measures to address for augmented environmental monitoring.</p>
March 21, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: Request from MSIFN to Develop a Terms of Reference for an Independent review of the DNNP Shoreline Protection Designs	<ul style="list-style-type: none"><li>DNNP</li><li>Shoreline Protection</li></ul>	An email was received from MSIFN requesting that OPG provide further information regarding the project's 3 <sup>rd</sup> party review of shoreline protection designs. MSIFN has requested to work with OPG to develop a Terms of Reference to guide their independent review of the designs.	N/A
March 22, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Notification that requested materials are available for review in the SharePoint	<ul style="list-style-type: none"><li>DNNP</li><li>Shoreline Protection</li><li>Environmental Monitoring and Reporting</li><li>DNNP Site Layout</li><li>Site Preparation</li></ul>	An email was sent to the Mississauga WTFNs notifying them that the requested materials are available for review in the SharePoint site.	N/A
March 26, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: OPG Notice to Mississauga WTFNs of Notice to Append Existing LOA to DFO, to support additional Geotechnical Drilling in Lake Ontario	<ul style="list-style-type: none"><li>DNNP</li><li>CCW Loop Tunnel</li><li>Federal/Provincial Permitting</li></ul>	An email was sent to the Mississauga WTFNs notifying them of the intended submission of a Notice to Append to the DFO for the existing Letter of Advice to support additional geotechnical investigation work (borehole drilling) in the proposed loop tunnel area in Lake Ontario	N/A
March 26, 2024	<ul style="list-style-type: none"><li>Alderville First Nation</li><li>Curve Lake First Nation</li></ul>	Email: OPG request status update on ECA, ESA and PTTW permit/approval reviews	<ul style="list-style-type: none"><li>DNNP</li><li>ESA</li><li>ECA</li><li>PTTW</li><li>Stormwater Management</li><li>Site Preparation</li></ul>	Email(s) were sent to representatives of Alderville and Curve Lake First Nations, requesting a status update of permit/approval reviews, and interest for a future station and/or waste facility tour(s).	N/A
March 27, 2024	<ul style="list-style-type: none"><li>Alderville First Nation</li></ul>	Email: AFN Response to OPG on status of permit/approval reviews	<ul style="list-style-type: none"><li>DNNP</li><li>ESA</li><li>ECA</li><li>PTTW</li><li>Stormwater Management</li></ul>	Email response from AFN on status of permit/approval reviews; stated they are deferring to sister Nations (Mississauga First Nations of	N/A



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			<ul style="list-style-type: none"><li>Site Preparation</li></ul>	the WTFN) feedback on these topics.	
March 27, 2024	<ul style="list-style-type: none"><li>Georgina Island First Nation</li></ul>	Trades career fair.	<ul style="list-style-type: none"><li>Promotion of ION program, DNNP opportunities.</li></ul>	Focus on Indigenous youth.	N/A
March 27, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li></ul>	Email: DNNP Response to HFN Comments on the DNNP PTTW Application to the MECP	<ul style="list-style-type: none"><li>DNNP</li><li>Permit to Take Water</li><li>Federal/Provincial Permitting</li></ul>	Email to Hiawatha First Nation representatives that included the DNNP’s response to the comments submitted by HFN on the DNNP’s Permit to Take Water Application to the MECP.	N/A
March 27, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: OPG’s Indigenous Knowledge Study Scope Proposal/GANTT Chart	<ul style="list-style-type: none"><li>DNNP</li><li>Indigenous Knowledge Study</li></ul>	An email was sent from OPG to the Mississauga WTFNs to initiate the scoping phase for the proposed IKS; OPG noted that the Nations will be scoping the study out independent from OPG, but that OPG will remain supportive of the process and react to requests and support needed. OPG requested that proposed timelines, budgets and next steps be provided when available.	N/A
March 28, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Regular monthly meeting.	<ul style="list-style-type: none"><li>Action List Review</li><li>Environmental Updates</li><li>Shoreline Protection in support of LTC</li><li>DNNP Climate Change Assessment Report (Phase 2)</li></ul>	<p>For predictive risk assessment, WTFN advised OPG to contact Great Lakes Steelhead Assoc. for insight on fish receptors.</p> <p>WTFN advised OPG to contact MNRF and other provincial bodies re: armourstone and possible increases in water temperature.</p>	<p>Action List Review: list to be amended between long-term/standing items and shorter-term items. Will be a regular feature of monthly meetings.</p> <p>Environmental Updates, Environmental Predictive Risk Assessment for DNNP: Discussion regarding Indigenous lens and receptors (people) currently missing from process. WTFN believes this topic should be reviewed by experts in field versus the reps in meetings. Overall, a profile for a person who works at the site, lives approximate and harvests in area would be ideal.</p> <p>Environmental Monitoring Plan: Noted by WTFN that not all relevant information was shared in time. Also, that while municipal and provincial input was included there was none from WTFN. Overall, WTFN stressed that overall scope of work needs to be shared vs a piecemeal approach. Enviro team to regroup and respond to the items identified by WTFN.</p> <p>Shoreline Protection Report: update on status based on what was previously shared and what is upcoming. Future information packages in October but updates to be ongoing. Question on modelling used: longshore transport modelling for armourstone revetment. A peer review contact within OPG was requested.</p> <p>Climate Change Assessment: WTFN feedback received and incorporated to draft. Submission to CNSC will be delayed to May to accommodate additional WTFN content. Update discussion in April. Scugog Island noted workload re:</p>



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					Pickering intervention. Additional time possible and input can be ongoing after CNSC submission.
April 3, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: DNNP Response to MSIFN Comments on the Phase 1 Climate Change Risk Assessment	<ul style="list-style-type: none"><li>DNNP</li><li>Climate Change Risk Assessment</li></ul>	An email was sent to MSIFN that included the DNNP's response to comments submitted by MSIFN on the Phase 1 Report for the DNNP Climate Change Risk Assessment; the email also included copies of OPG's Climate Change Plan, and the DNNP's Climate Change Design Guide	N/A
April 3, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li><li>Curve Lake First Nation</li></ul>	Email: OPG Email response to HFN/CLFN request for additional site preparation documents	<ul style="list-style-type: none"><li>DNNP</li><li>Site Preparation</li><li>Site Specific Environmental Management Plan</li></ul>	OPG sent an email providing representatives of HFN and CLFN with the DNNP Site Preparation Phase: Project Site Specific Safety Plans to support reviews of the SSEMP for Site Preparation of SMR Units 2, 3, 4	N/A
April 3, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li></ul>	Email: OPG/DNNP Response to HFN comments on the Stormwater Management ECA Amendment Application, and ESA Permit	<ul style="list-style-type: none"><li>DNNP</li><li>Stormwater Management</li><li>Site Preparation</li><li>Environmental Compliance Approval</li><li>Endangered Species Act</li><li>Federal/Provincial Permitting</li></ul>	OPG emailed the DNNP's response to HFN comments on the Stormwater Management ECA Amendment Application, and the ESA Permit application to support site preparation for SMR units 2, 3, 4	N/A
April 3, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: MSIFN Request for DNNP Site Maps to support SSEMP review	<ul style="list-style-type: none"><li>DNNP</li><li>Site Mapping</li><li>SSEMP</li><li>Site Preparation</li></ul>	OPG received an email request from MSIFN for additional DNNP site mapping to assist with the review of the DNNP Site Specific Environmental Management Plan supporting site preparation of SMR units 2, 3, 4	N/A
April 3, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Mississauga WTFN Response to OPG RE: Indigenous Knowledge Study	<ul style="list-style-type: none"><li>DNNP</li><li>Indigenous Knowledge Study</li></ul>	Representatives from the Mississauga WTFNs provided OPG with a response regarding the status of the proposed Indigenous Knowledge Study and scoping. MSIFN currently drafting a framework for the execution of the IKS; next step is a review and approval	N/A



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				process by leadership of the First Nations.	
April 8, 2024	<ul style="list-style-type: none"><li>Alderville First Nation</li></ul>	Signed capacity funding agreement received and acknowledged.	OPG to review and execute with DNNP executive signature—pending.	N/A	N/A
April 8, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: DNNP Project Materials sent to the Mississauga WTFNs to support reviews of the SSEMP and Climate Change Risk Assessment Phase reports	<ul style="list-style-type: none"><li>DNNP</li><li>SSEMP</li><li>Site Mapping</li><li>Climate Change Risk Assessment</li></ul>	OPG provided the requested site mapping resources to support the ongoing FN review of the DNNP SSEMP supporting site preparation for SMR units 2, 3, 4; As well provided copies of OPG’s Climate Change Action Plan and the DNNP’s Climate Change Design Guide to support ongoing reviews of the DNNP’s Phase 1 & 2 Climate Change Risk Assessment Reports.	N/A
April 11, 2024	<ul style="list-style-type: none"><li>Métis Nation of Ontario Region 8</li></ul>	Follow-up virtual meeting from March 13 re: monitoring.	Opportunity to visit the DNNP and/or DNNP site to review monitoring activities undertaken by OPG supporting LTC.  Tour and presentation.	Site visit would be prelude to active participation in monitoring if so desired by MNO 8.  MNO 8 to provide species of interest to them which may not be known to OPG.  MNO 8 noted that it does not have rights at the site, but their citizens do have questions and concerns related to environmental protection.	Note that MNO election is May 6; meeting in June advised.  Visitation to bank swallow model habitat at PNGS also of interest to MNO 8.
April 12, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Meeting Materials to support the upcoming DNNP/WTFN Permit Meeting	<ul style="list-style-type: none"><li>DNNP</li><li>CCW</li><li>Shoreline Protection</li><li>Site Preparation</li></ul>	Email was sent to the Mississauga WTFNs providing the meeting materials to support presentations and discussions at the upcoming April DNNP/WTFN Permit Meeting.	N/A
April 15, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Response to WTFN Questions/Requests during March 2024 DNNP/WTFN Monthly Meeting	<ul style="list-style-type: none"><li>DNNP</li><li>Site Preparation</li><li>SSEMP</li><li>Environmental Monitoring</li></ul>	An email was sent to representatives of the Mississauga WTFNs providing written responses to questions and requests made during the March 2024 DNNP/WTFN Monthly Meeting. The questions were regarding the site preparation and the Site-	N/A



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				Specific Environmental Management Plan (SSEMP). An additional request was received in response from the WTFNs to receive the species tables and initial survey data collected prior to clearing and grubbing.	
April 15, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li></ul>	Email: HFN submission of comments to OPG RE: DNNP Soil Containment Structure Stormwater Management ECA Application	<ul style="list-style-type: none"><li>- DNNP</li><li>- ECA</li><li>- Stormwater Management</li><li>- Federal/Provincial Permitting</li></ul>	Representatives of Hiawatha First Nation provided OPG with comments and feedback regarding the Environmental Compliance Approval application for the DNNP Soil Containment Structure Stromwater Management.	N/A
April 16, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: MSIFN submittal of comments regarding the draft SSEMP for DNNP	<ul style="list-style-type: none"><li>- DNNP</li><li>- SSEMP</li><li>- Site Preparation</li></ul>	MSIFN submitted via email their comments and feedback regarding the drafted Site-Specific Environmental Management Plan to support the DNNP Site Preparation for SMR units 2, 3, 4.	N/A
April 16, 2024	<ul style="list-style-type: none"><li>Métis Nation of Ontario Region 8</li></ul>	Email inquiring about 10-year nuclear overview at OPG.	Request for an overall document or documents and/or presentation.	Reply same date: OPG will work on a presentation and work with MNO 8 for a day/time.	Project meeting for June/24.
April 16, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog island First Nation</li></ul>	Email: DNNP responses to MSIFN comments/feedback on the Darlington New Nuclear Project: Main Site Preparation Phase of the First Reactor/Endangered Species Act Beneficial Actions (CPAF) Summary Report	<ul style="list-style-type: none"><li>- DNNP</li><li>- Endangered Species Act (ESA)</li><li>- Site Preparation</li></ul>	OPG/DNNP provided their written responses to MSIFN's comments/feedback on the Darlington New Nuclear Project: Main Site Preparation Phase of the First Reactor/Endangered Species Act Beneficial Actions (CPAF) Summary Report	N/A
April 16, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: Response to MSIFN with update and further information RE: 3 <sup>rd</sup> Party Shoreline Protection Review	<ul style="list-style-type: none"><li>- DNNP</li><li>- Shoreline Protection</li></ul>	An email update was sent to MSIFN representatives providing a response to requested information on the scope of OPG's existing 3 <sup>rd</sup> Party/Independent review of Shoreline Protection Designs. To support the process of developing a Terms of Reference and defined scope for MSIFN's independent review of Shoreline Protection designs.	N/A
April 18, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li></ul>	Monthly permit meeting.	<ul style="list-style-type: none"><li>CCW/Shoreline Protection: permit</li></ul>	Environmental subjects discussed throughout meeting.	CCW/Shoreline: Fisheries Act Authorization process and WTFN involvement. Noted that final plan will lessen habitat and species impact. Review time of



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	<ul style="list-style-type: none"><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>		<p>planning review, scope and package to be shared; in-water work.</p> <ul style="list-style-type: none"><li>DNNP site preparation updates as per LTC.</li><li>Environmental updates</li></ul>	<p>Terms of Reference regarding shoreline work will require separate table out of regular meeting cycle.</p> <p>Volume of water use din intake and outflow (cubic meters squared) to be determined and shared with Nations, monitoring participation as well.</p> <p>WTFN reps expressed desire to receive plans as a whole vs piecemeal to better understand scope.</p> <p>WTFN reps requested legends on maps. Slides may not have room, to also send PDFs. Out of cycle mapping meeting.</p>	<p>package will be 90 days. WTFN emphasized that offsetting must occur proximate to site in line with DFO direction. Fisheries authorization linked to LTC being granted (assumes early 2025).</p> <p>DNNP site preparation updates: grubbing and clearing related to ESA to continue through calendar year. WTFN expressed concerns re: Beneficial Action Areas for all sites—how to protect from future development? Legal easement? To be researched. OPG made offer of a site visit to sites 2, 3, 4. Discussion on off-site mitigation areas to compliment BAAs; concept if using lands preferred by citizens for harvesting in line with 2018 settlement vs conservation areas. In future 3 permits required: ECA, CLOCA and DFO; to come forward in May/June 2024.</p>
April 18, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: Request for OPG to organize a meeting to advance a Terms of Reference for Independent review of Shoreline Protection designs	<ul style="list-style-type: none"><li>DNNP</li><li>Shoreline Protection</li></ul>	An email request was received from representatives at MSIFN to organize and schedule a meeting to advance a Terms of Reference to support MSIFN's independent review of DNNP shoreline protection designs. MSIFN has hired a contractor to assist with this review.	N/A
April 22, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li><li>Curve Lake First Nation</li></ul>	Email: HFN and CLFN Representatives emailed OPG RE: Offsetting Site Selection information request	<ul style="list-style-type: none"><li>DNNP</li><li>Environmental Offsetting/Restoration</li></ul>	An email was received by representatives on behalf of HFN and CLFN requesting further information regarding environmental offsetting site selection, meeting recordings and access, requesting that information be provided in a transparent manner. Email was responded to, planned discussions specific to Aquatic and Terrestrial Offsetting being planned.	N/A
April 22, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li></ul>	Email: HFN submittal of technical comments regarding various scopes of the DNNP	<ul style="list-style-type: none"><li>DNNP</li><li>Federal/Provincial Permitting</li><li>Shoreline Protection</li></ul>	Representatives of Hiawatha First Nation submitted to OPG a series of technical comments and feedback regarding various scopes of the DNNP, including:	N/A



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			<ul style="list-style-type: none"><li>Climate Change Risk Assessment</li><li>CCW</li><li>SSEMP</li></ul>	Climate Change Risk Assessment, Shoreline Protection, SSEMP, DFO Request for Review, and meeting specific feedback.	
April 24, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Meeting materials sent to the Mississauga WTFNs to support the DNNP/WTFN Monthly Meeting	<ul style="list-style-type: none"><li>DNNP</li><li>Nuclear Waste</li><li>Environmental Monitoring</li><li>Beneficial Action Areas</li><li>Climate Change Risk Assessment</li><li>Endangered Species Act (ESA)</li></ul>	Email was sent to representatives of the Mississauga WTFNs to provide the meeting materials to support the upcoming DNNP/WTFN Monthly Meeting	N/A
April 25, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Monthly meeting.	<ul style="list-style-type: none"><li>Action Items Review</li><li>DNNP Waste and LLW Initiative Update</li><li>DNNP Climate Change Risk Analysis Phase 1 and Phase 2 Discussions (Daniel Cote)</li><li>DNNP Environment Team Topics: -ESA Permit:</li><li>Beneficial Action Areas Planting Plans (Developed by CIPS)</li></ul>		<p>Action Items: OPG to arrange tripartite meeting with CLOCA re: Beneficial Action Areas.</p> <p>Update on bank swallows from Beacon in May.</p> <p>WTFN requested updated, layered maps with legends from OPG re: site(s). Dewatering proposal forthcoming from OPG.</p> <p>Coastal flooding data requested by WTFN.</p> <p>Tripartite meeting required to discuss purchase of lakebed lands for CCW (Ontario).</p> <p>Inquiry whether MSIFN risk assessment complete yet.</p> <p>OPG to respond to MSIFN and 4 Directions SSEMP questions. Review IER for missing actions.</p> <p>DNNP Waste and LLW Initiative Update Question re: length of outage to refuel—30 days.</p> <p>MSIFN engaged in independent peer review though having difficulty finding non-conflicted SME.</p> <p>Construction of unit and climate change robustness. Will more than 115 DSC be needed and transportation of casks (not DSCs) to NWMO site.</p> <p>Waste and fuel to be stored on site until licensed off-sites determined; to WTFN the interim storage of waste was not clear in bounding documents; requires answer. Concerns that NWMO site is not yet approved; what is the alternative?</p>



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					<p>DNNP Climate Change Risk Analysis Phase 1 and Phase 2 58 systems met climate change challenges, 19 did not—actions to amend these items.</p> <p>Will CNSC review and approve plans per risk (PMP); no but as part of the planning lifecycle WTFN will be consulted.</p> <p>Erosion affecting armourstone is a risk, e.g., what if side is exposed? How to fix?</p> <p>Is there a methodology on combined impacts? As new science is made available, it will be applied to updating the plans.</p> <p>Concern re: lake temperature threshold, direct impacts when unit in operation.</p> <p>Beneficial Action Areas Planting Plans (Developed by CIPS). Plan was previously discussed and updated based on WTFN input, e.g., bat box design, boxes for blue birds, monitoring of baths and bank swallows.</p> <p>Discussion on habitat creation areas. MSIFN tasked OPG as to whether a legal easement or other instrument can be used to prevent any industrial development of the BAAs.</p>
April 26, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: MSIFN Submittal of comments/feedback on DNNP Climate Change Risk Assessment Phase 2 Risk Treatment Report	<ul style="list-style-type: none"><li>- DNNP</li><li>- Climate Change Risk Assessment</li></ul>	MSIFN submittal of comments and feedback regarding the DNNP Climate Change Risk Assessment Phase 2 Risk Treatment Report, as well as additional comments/feedback on OPG's responses to MSIFN RE: Feedback on the Phase 1 Risk Analysis Report.	N/A
April 26, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Response to Mississauga WTFNs request for detailed site mapping	<ul style="list-style-type: none"><li>- DNNP</li><li>- Site Mapping</li></ul>	Response to Mississauga WTFNs request for detailed site mapping detailing proposed areas for onsite waste storage; map and legend provided detailing the areas proposed for waste storage and surrounding Beneficial Action Areas.	N/A
May 7, 2024	<ul style="list-style-type: none"><li>Métis Nation of Ontario Regio 8</li></ul>	Email	<p>Advisement of MNO 8 election results.</p> <p>Request for 10-year overview of Nuclear presentation, all sites, in June 2024.</p>	OPG advised internal team to meet and confirm date.	N/A



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May 7, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Emails	Regarding OPG approval of amended or new Contribution Agreements.	Nations to review/respond.	N/A
May 7, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	Coastal Flood Hazard Assessment Design Criteria	In response to a request from the Mississauga WTFNs to receive the design criteria for the DNNP Coastal Flood Hazard Assessment; A summary of the design criteria and copies of the referenced reports were provided to the WTFNs, materials were uploaded to the SharePoint site as well.	N/A
May 7, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email: Meetings Materials for upcoming May DNNP/WTFN Permit Meeting	<ul style="list-style-type: none"><li>- DNNP</li><li>- Stormwater Management</li><li>- Environmental Compliance Approval</li><li>- Dock Dredging</li><li>- Federal/Provincial Permitting</li></ul>	Email was sent to representatives of the Mississauga WTFNs, transmission of materials to support presentations and discussions at the upcoming May DNNP/WTFN Permit Meeting.	N/A
May 7, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li></ul>	Email	DNNP Capacity Funding Agreement	Email transmission of proposed amended capacity funding agreements for the DNNP. Received by representatives of HFN, CLFN and MSIFN; to be reviewed by First Nation leadership.	N/A
May 7, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	EMEAF Monitoring Schedule for 2024, DNNP Environmental Risk Assessment Ecological Receptors	Email was sent to representatives of the Mississauga WTFNs providing the 2024 DNNP EMEAF Monitoring schedule, requesting the Nations to identify opportunities to be involved; and providing information regarding the DNNP Environmental Risk Assessment ecological receptors list, requesting review/input if applicable.	N/A
May 8, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li></ul>	Email	Proposed meeting involving CLOCA, DNNP Project	Request for availability of representatives of the	N/A



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	<ul style="list-style-type: none"><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>		Team, and the Mississauga WTFNs RE: Beneficial Action Areas (ESA Permitting requirements)	Mississauga WTFNs to attend a proposed tri-partite meeting involving CLOCA and DNNP Project Staff to discuss potential offsite Beneficial Action Areas per ESA Permitting; Discuss potential site at Lynde Shores Conservation Area	
May 9, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li><li>Chippewas of Rama First Nation</li><li>Chippewas of Georgina Island First Nation</li><li>Chippewas of Beausoleil</li></ul>	Email.	DNNP CCW and Shoreline Protection Description & Engagement and Consultation Opportunities re: LTC.	Required notification as per DFO, CNSC.	Issues to be discussed during regularly scheduled meetings.
May 9, 2024	<ul style="list-style-type: none"><li>Mohawks of the Bay of Quinte</li></ul>	Email.	DNNP CCW and Shoreline Protection Description & Engagement and Consultation Opportunities re: LTC.	Required notification as per DFO, CNSC.	Issues to be discussed during regularly scheduled meetings.
May 9, 2024	<ul style="list-style-type: none"><li>Métis Nation of Ontario Region 8</li></ul>	Email.	DNNP CCW and Shoreline Protection Description & Engagement and Consultation Opportunities re: LTC.	Required notification as per DFO, CNSC.	Issues to be discussed during regularly scheduled meetings.
May 10, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	Hiawatha First Nation technical comments regarding the DNNP EMEAF, and DNNP ESA BAA Planting Plans	Receipt of an email from representatives of Hiawatha First Nation including technical comments and feedback regarding the DNNP Environmental Monitoring and EA Follow-up Program (EMEAF), and the DNNP ESA (SMR Unit 1) Beneficial Action Areas (BAAs) Planting and Habitat Creation Plans (developed by Cambium Indigenous Professional Services/CIPS).	N/A



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May 10, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	Proposal to hold an Aquatic Offsetting Workshop style meeting	An email request was sent to representatives of the Mississauga WTFNs to dedicate the May 23 <sup>rd</sup> DNNP/WTFN Monthly Meeting to Aquatic Offsetting discussions; a request to the FNs for availability to host an in-person workshop style meeting	N/A
May 10, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Emails	DNNP Shoreline Protection Design Independent Review	Email from MSIFN representatives requesting a status update on the planning and scheduling for a meeting to discussing Terms of Reference and scope for an independent review of DNNP Shoreline Protection Designs	N/A
May 14, 2024	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li></ul>	Email	Shoreline Protection Design Independent Review	Email to representatives of MSIFN, providing an update and requesting a meeting to discuss the Terms of Reference and guidance to support an independent review of DNNP Shoreline Protection designs; requesting to hold a meeting for two hours on May 27 <sup>th</sup> /2024.	N/A
May 15, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	<ul style="list-style-type: none"><li>Availability to schedule and hold a workshop to discuss Aquatic Offsetting</li></ul>	An email was sent to representatives of the Mississauga WTFNs to request feedback on availability to schedule and conduct a workshop style meeting to discuss and collaborate on Aquatic Offsetting for the DNNP; request to the representatives provide availability via an online poll.	N/A
May 15, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	<ul style="list-style-type: none"><li>Agenda proposal for May DNNP/WTFN Monthly Meeting</li></ul>	Email correspondence to the Mississauga WTFNs proposing an agenda for the upcoming May 2024 DNNP/WTFN Monthly Meeting; focusing on environmental related topics including: EMEAF Plan and 2024 monitoring schedule, ESA BAA Planting and Habitat Creation Plans, and Bank Swallows	N/A

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May 16, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Permit meeting in support of LTC.	<ul style="list-style-type: none"><li>Stormwater Management (ECA Amendment)</li><li>Dock Dredging</li><li>Aquatic Offsetting Primer</li></ul>	WTFN representatives communicated that OPG needs to consistently provide materials in draft for comment/disposition and potential use by OPG before finalization.	<p>Stormwater Management</p> <p>OPG shared design plans for Areas 16A and B re: construction purposes. Design is in exceedance of requirements.</p> <p>The SWM reports is being drafted and WTFN reps asked for a copy to review before it is accepted. The original report was previously shared.</p> <p>Dock Dredging to facilitate off-loading of DNNP components (non radiological).</p> <p>Timeline was shared for DFO approval in summer 2024 with work slated for fall 2024. WTFN reps expressed concern that previous study of site for benthic and related species might not be current and recommended a new survey. It was relayed that there are no SAR in harbour area, though again WTFN is seeking confirmation.</p> <p>Approvals for work required from DFO, MNRF and CLOCA and will be sought simultaneously.</p> <p>WTFN requested DFO contacts (provided) and existing guidelines. If new survey is done it will take a month to turn around though the reports are succinct re: pages to review. There was discussion on the methodology OPG was employing for its dredging plans.</p> <p>Aquatic Offsetting Primer</p> <p>A presentation was provided regarding offsetting option as per DFO regulations. Offsetting examples, target species and pros/cons were discussed.</p> <p>Key offsetting examples shared included stream rehabilitation, habitat islands /breakwaters, and wetland creating. It is possible that all three could be brought into play.</p> <p>It was recommended that OPG cover DNGS and PNGS offsets are the same time. Consider us of HQ wetlands in Oshawa and other area OPG owns or can access. It was noted that habitat island and breakwaters would help promote a more naturalistic approach to planned shoreline protection. DFO monitoring is typically and 5 and 10 years, though can be longer; WTFN interested in such monitoring.</p> <p>It was agreed that there would be a collaborative session on June 11<sup>th</sup> to discuss aquatic offsets, possibly terrestrial offsets and off-site restoration.</p>
May 16, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li></ul>	Email	<ul style="list-style-type: none"><li>Primary DFO Contact Information</li></ul>	During the May 16 <sup>th</sup> DNNP/WTFN Permit Meeting, there was a request to receive the primary contacts that DNNP	N/A



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	<ul style="list-style-type: none"><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>			are working with at the DFO; contact information provided by OPG/DNNP team.	
May 18, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation.</li></ul>	OPG representation at Pow Wow.	DNNP, ION, Procurement and Business Opportunities, varying OPG topics	N/A	Offered information on DNNP and the ION program.
May 21, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Email	May 2024 DNNP/WTFN Meeting Materials	Email distribution of meeting materials to support presentations and discussions at the upcoming May DNNP/WTFN Monthly Meeting, materials uploaded to the SharePoint site as well. Topics to include: EMEAF Plan and 2024 monitoring schedule, ESA BAA Planting and Habitat Creation Plans, and Bank Swallows	N/A
May 23, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li></ul>	OPG representation at trades-focused career fair re: ION program, Advanced Inspection and Maintenance, Radiation Protection.	N/A	N/A	OPG assisted in organization and funding of event.
May 23, 2024	<ul style="list-style-type: none"><li>Curve Lake First Nation</li><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li><li>Alderville First Nation</li></ul>	Monthly Meeting, LTC subject matter	<ul style="list-style-type: none"><li>Upcoming EMEAF Monitoring (2024 Monitoring Activities)</li><li>DNNP ERA: Ecological Receptors (Request for FN Input into Receptors Selected)</li><li>Rev. 2 of EMEAF Plan</li></ul>	Primarily virtually attended by participants, no CLFN Consultation Staff representation (CLFN represented by 4D in the meeting)	Action Items:  OPG to connect with MSIFN offline to discuss the status of the IKS further  OPG to provide WTFNs update on status of additional groundwater monitoring  OPG to schedule interim waste storage focused meetings with the FNs  Provide 4Directions/HFN with the Indigenous Engagement Report logs that were reviewed by Kenn (IR)  confirm with Climate Change Risk Team on the understanding and process with CNSC for submitting FN feedback on Phase Reports  OPG to provide the WTFNs with a memo detailing the DFO and DNNP’s decision regarding benthic invertebrate surveying  4Directions/HFN requested that all maps that are shared include written/detailed legends  Revisit DNNP ERA and DNNP EMEAF Rev. 002 Plan for further discussion at subsequent DNNP/WTFN meeting(s)



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Darlington New Nuclear Project Indigenous Engagement Report November 2023 to May 2024

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					<p>MSIFN requested that OPG provide rationale for decision to not pursue seed collection on site; this is an accepted practice, not an unusual recommendation</p> <p>Indigenous Knowledge Study update:</p> <p>Progress dependant on execution of project agreement; OPG has drafted and currently under review; Ideal to have the IKS imbedded in the project agreement; Discussions with FN leadership are progressing; focus on the governance of the study and how it will be executed; Current understanding is that MSIFN will utilize Framework Agreement and Capacity Funding Agreement budgets to progress</p> <p>OPG to ensure that the MOE Delegation Letter included the MECP (internal alignment); in 2022 the project assumed MOE delegation included MECP scope; this needs to be clarified as the FNs feel it is appropriate for each regulator/ministry to provide individual delegation letters Further – RE: the CIPS BAA Planting Plans, the Nations are looking to actively participate and collaborate during the planning phases, not a “review and approve” process (as has been relied upon in the past)</p> <p>OPG proposed to host a DNNP site tour this summer; also having site updates line item at each meeting (inclusive of up-to-date images of the site) OPG proposing to hold dedicated meetings to discuss DNNP and interim waste storage; looking to schedule outside of the regular rotation of permitting and monthly DNNP meetings</p> <p>HFN requested to receive the Indigenous Engagement Reports that have been submitted to the CNSC (public documents) that were reviewed by OPG IR.</p> <p>MSIFN requested for clarification and alignment on the understanding of the process for submitting the Climate Change Risk Assessment Phase reports to the CNSC and receiving/incorporating MSIFN feedback.</p> <p>RE: Dock Dredging and the DFO – a meeting occurred between DNNP and DFO to discuss benthic invertebrate surveying; DFO determined that Benthic surveying is not required for the DNGS dock area (proposed area for Dock Dredging works). HFN: FNs are at a disadvantage when the project has conversations with regulators and no alignment with the Nations occurs; obvious differing perspectives on what needs to be done; crucial to provide written confirmation of decisions made outside of engagements with the Nations</p> <p>DNNP Environment Updates: EMEAF Plan was drafted around 2013; a new version was drafted in 2021 (EMEAF Rev.000); EMEAF Rev.001 issued in 2022; EMEAF Rev.002 in</p>
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					<p>2023; WTFN Feedback informed the drafting of Rev.002; the field monitoring schedule has been shared for 2024</p> <p>MSIFN reiterated the potential inclusion of a human receptor group that reflects being an employee at OPG + FN(INDIG) Person + Harvester/Gatherer + Male/Female/Other Identified Gender group; OPG stated that this previous feedback has been received, and the team is working on how best to characterize this type of receptor group</p> <p>MSIFN noted that the IKS has not been completed, therefore it will not inform this ERA process, will not inform decisions on selected receptor groups; this should be noted in the report; qualify that the IKS did not inform decisions made for the DNNP Predictive ERA; noted that minimal input was provided by the WTFN Nations in 2009; and that the Fed. &amp; Prov. Govt's, and OPG may have wrongly interpreted WTFN rights during the original EA process (2009); this impacts the validity of information gathered and determinations made prior to 2018 (WTFN Settlement Agreement)</p> <p>CIPS Habitat Creation Plans (BAAs for Unit 1): Initial planting plans were developed alongside the preparation of ESA Permit #1 (To support site preparation for Unit 1) in early 2023; requested feedback from the Nations; received feedback from MSIFN, HFN and CLFN The DNNP is in the process of responding to 4 Directions (HFN) comments; HFN requests to see the plans for bluebird boxes, referencing potential impacts to other species in the area</p> <p>MSIFN: why were sugar maples not included in the list if species to be planted? WTFNs: sugar maples are protected under the Gunshot Treaty, Treaty 20 and other pre-confederation agreements &amp; Treaties; therefore, impacts and compensation require consultation with the WTFNs MSIFN: did OPG perform seed collection of species onsite (prior to removal)? Response: clearing/grubbing was scheduled for winter 2024, it was determined to be unfeasible to perform seed collection; the DNNP has committed to locally sourcing seed mixes to ensure proximate procurement and integrity in the planting plans</p> <p>Fixed Face Earthen Embankment – Artificial Bank Swallow Structure at PNGS Constructed in 2021; Bank swallows have returned for 2024; this structure is <u>not</u> mitigation for DNNP impacts; DNNP continues to plan work in a way which will avoid removal of the natural bank swallow habitat.</p> <p>WTFNs: how is the current FFEE (Test Structure) being protected? Does this support future potential compensation? The structure was developed in partnership with MECP; protected under a Safe Harbour Stewardship Agreement under the ESA OPG: The DNNP is currently preparing the ESA application for construction, there are <u>no</u> planned impact/removal of bank swallow habitat</p>
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May 27, 2024	<ul style="list-style-type: none"><li>Scugog Island First Nation</li></ul>	Meeting with MSIFN to Discuss DNNP Shoreline Protection 3 <sup>rd</sup> Part Review TOR	DNNP Shoreline Protection	MSIFN has contracted a vendor to perform an independent review of the DNNP Shoreline Protection designs; meeting served to introduce everyone, align on collaboration for a TOR and scope, answer any questions that MSIFN and their contractor had on the DNNP Shoreline Protection designs; follow-up meeting scheduled for June 2024	N/A
May 29, 2024	<ul style="list-style-type: none"><li>Alderville First Nation</li></ul>	Email	2024 DNNP Capacity Funding Agreement	Email distribution of the final signed capacity funding agreement with OPG for the DNNP; AFN received a copy with AFN and OPG leadership signatures.	N/A
May 30, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li></ul>	Email	Harvested Butternut Trees on DNNP Site	Email correspondence was sent to representatives at HFN and MSIFN inquiring RE: interest and feasibility for HFN and MSIFN to pick up/receive the safe stated butternut tree logs that are currently stored at DNNP site.	N/A
May 31, 2024	<ul style="list-style-type: none"><li>Hiawatha First Nation</li><li>Mississaugas of Scugog Island First Nation</li></ul>	Email: CNSC Climate Change Phase 1 & 2	Disposition of questions, concerns issues re: DNNP climate change planning and LTC.	New science will inform OPG plans over time and WTFN will be informed.	N/A

### 3.0 DESCRIPTION OF PLANNED ENGAGEMENT ACTIVITIES

This IER provides the framework concerning planned engagement activities. This plan and associated implementation plans will be updated as necessary to remain current with project developments.

NK054-PLAN-01210-1078158, DNNP Indigenous Engagement Implementation Plan 2023-2024, provides the detailed plan for engagement activities. Appendix A provides an overview of the relationships between the DNNP plans, and OPG governance.

Engagement is primarily led by dedicated DNNP Indigenous Engagement staff, with support of other subject matter experts in the project. OPG's Indigenous Relations staff engage with Indigenous Nations and Communities on matters related to other projects and operations, and they also support DNNP engagement activities.

As engagement continues and the project progresses, areas of interest to Indigenous Nations and Communities will have as a focus any areas identified as having potential impacts to inherent and treaty rights. These include:

- Archeological planning and findings, potential for repatriation of artifacts
- Potential impacts to hunting and other harvesting rights
- Management of nuclear waste streams
- Impacts to the lake and land and the effect on plant, animal, and aquatic species, with particular interest in bio cultural species identified
- Emissions to air and water, including thermal plume effects
- Incorporation of Indigenous Knowledge Systems and ceremony into the project
- Opportunities for employment, businesses, and investment, e.g., Indigenous Opportunities Network (ION) Program

### 4.0 PROPOSED SCHEDULE FOR INTERIM REPORT TO CNSC

Currently, CNSC and OPG engage in monthly meetings to discuss OPG operations and projects and how these interact with Indigenous Nations and Communities. The DNNP Project is a regular agenda item on this call. The frequency of these contacts can be increased as needed.

OPG will provide updated reports to support Commission Member Documents (CMD) as part of ongoing planned licensing activities.

### 5.0 REFERENCES

1, NK054-PLAN-01210-1078158, DNNP Indigenous Engagement Implementation Plan 2023-2024

## APPENDIX A: POLICY AND PLAN HEIRARCHY

