

Darlington New Nuclear Project

CNSC Workshop Summary of Environmental Impact Statement Review

April 4, 2023



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start
small.

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Territory Acknowledgement



Agenda

- Introduction to the Darlington New Nuclear Project
- Project timeline
- Review of the Plant Parameter Envelope and summary of results
- Review of the Environmental Impact Statement and summary of results
- Overall conclusions



Introduction to the Darlington New Nuclear Project (DNNP)

- Proposed new nuclear power plant on the north shore of Lake Ontario in the Municipality of Clarington, within the Regional Municipality of Durham.
- Approved Environmental Assessment (EA) for site preparation, construction, operation, and decommissioning of up to four new nuclear power reactors to produce up to 4,800 megawatts of electrical generating capacity.
- EA concluded DNNP would not likely result in significant adverse effects
- Environmental Impact Statement (EIS) review conducted on BWRX-300 to confirm the EA conclusion



Project Timeline

How did we get here?

January 2023

OPG has partnered with GE Hitachi Nuclear Energy, SNC-Lavalin, and Aecon to construct the SMR.

October 2022

- OPG applied to the CNSC for a Licence to Construct.
- OPG begins site preparation activities at the Darlington site.
- The Canada Infrastructure Bank (CIB) finalized an agreement with OPG to commit \$970 million towards the project.

May 2022

The CNSC has approved OPG's revised financial guarantee, outlining our strategy to fund decommissioning activities associated with site preparation work.

March 2022

OPG awarded E.S. Fox Ltd. the contract to complete site preparation activities.

December 2021

OPG selects GEH to further develop the BWRX-300 SMR design, with the mutual goal of constructing Canada's first commercial, grid-scale SMR.

October 2021

After a hearing in June 2021, the CNSC announced approval of OPG's application to renew the existing Site Preparation Licence for a 10-year period.

November 2020

OPG announced resumption of planning activities for future nuclear power generation using a SMR at the Darlington site.

June 2020

OPG submitted an application to the CNSC seeking renewal of the Site Preparation Licence.

December 2013

Citing lower than planned power consumption growth and a strong supply situation, the Government of Ontario requested OPG defer construction of new nuclear reactors but maintain the existing licence for future generation.

August 2012

The CNSC issued the Licence to Prepare Site to OPG for a period of 10 years.

May 2012

The Government of Canada accepted the recommendation of the Joint Review Panel (JRP) and the Environmental Assessment (EA).

March 2011

The JRP hosted 17 days of public hearings on the EA, addressing the project need, purpose and alternatives and potential effects on all aspects of the environment.

Darlington New Nuclear Roadmap

BIG things start **small**.



2021

2022

2024

2028



Site Preparation
Licence Renewal
Issued

SMR Technology
Selected

Site Preparation
Activities Began

Licence to
Construct
Application
Submitted

Licence to
Construct
Issued

Licence to
Operate
Issued

Construction
complete in 2028
with commercial
operation in 2029

2021: CNSC Public Hearing
for Site Preparations

2024: CNSC Public Hearings
for Licence to Construct

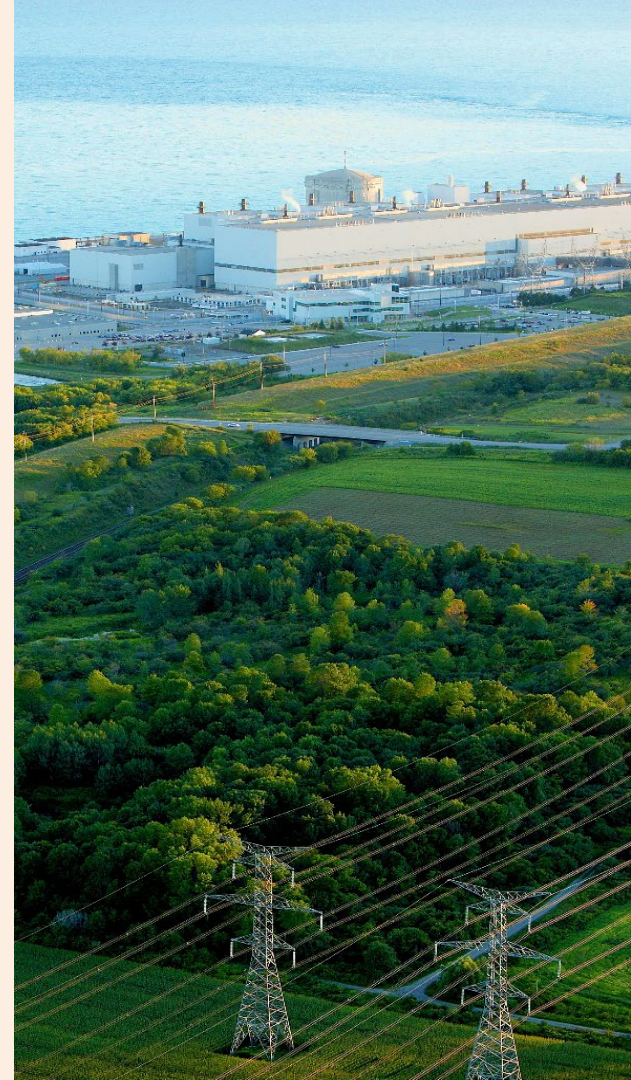
2028: CNSC Public Hearing
for Licence to Operate





DNNP Environmental Assessment

- An EIS for the DNNP was submitted by OPG in 2009.
- A bounding framework was developed which considered various reactor technologies and was used to develop a set of design parameters, known as a Plant Parameter Envelope (PPE).
- In May 2012, the Government of Canada accepted the Joint Review Panel (JRP) determination that the DNNP is not likely to result in significant adverse effects.
- In August 2012, the CNSC issued a Power Reactor Site Preparation Licence.





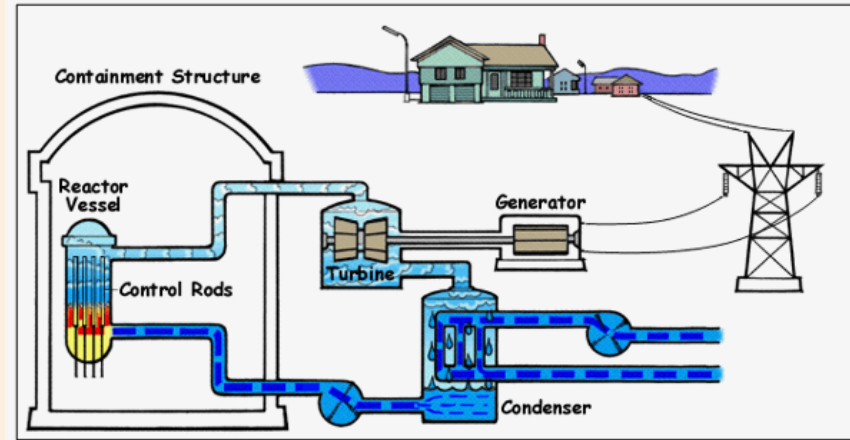
The DNNP PPE – What is it?

- A PPE is developed to assist in evaluating the potential safety and environmental effects of multiple reactor designs being considered.
- The PPE is a listing of values that can be used in the EA and licence applications to assist in predicting the potential safety and environmental effects.
- The PPE concept is accepted by regulatory agencies in Canada and the US
- PPE parameters encompass vendor information provided from three Pressurized Water Reactors (PWRs) and Pressurized Heavy Water Reactor
- OPG made a commitment to confirm the selected design fits within the PPE, or to update the envelope based on appropriate assessments.

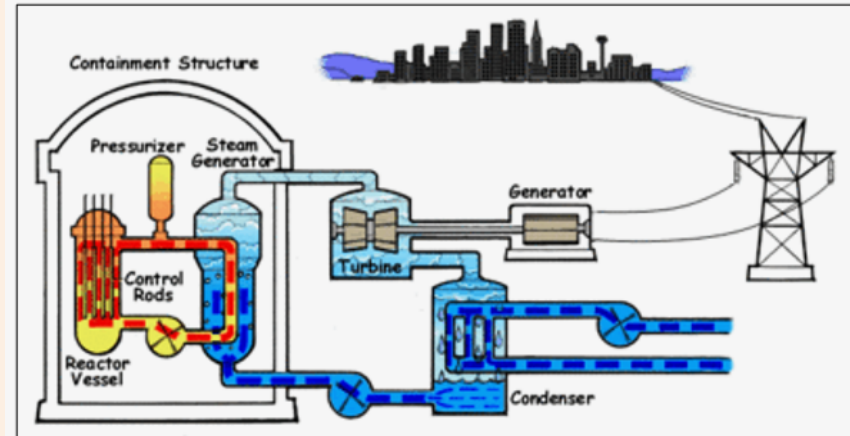


Boiling Water Reactors

- The boiling water reactor design is similar to the pressurized water designs considered in the EIS.
- Both use a uranium fuel of similar enrichment and are light water cooled and moderated.
- The shape of the reactor core, a vertical arrangement of fuel assemblies, and the means of shutting down the nuclear reaction are the same.
- Major equipment including turbine, generator, condenser and containment are all similar.
- Differences include the single coolant loop which negates the need for a steam generator.



Boiling Water Reactor (e.g., BWRX-300)



Pressurized Water Reactor



DNNP Not Fundamentally Different



- The DNNP EA used a bounding approach, since no technology had been selected at the time.
- The Government of Canada's response to the 2011 Environmental Assessment Report for DNNP included the following statement:
Any RA (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
- OPG's comprehensive assessment of the BWRX-300 against the reactor technologies assessed by the JRP demonstrates that the BWRX-300 is not fundamentally different.
- The vast majority of BWRX-300 design parameters are within the original PPE values – and those that are not have been assessed as consistent with the conclusions of the DNNP EIS.
- The environmental effects of the BWRX-300 are less overall than those examined in the EA.



Darlington New Nuclear Project PPE and EIS Review

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DNNP Environmental Assessment Commitments

- Commitments made by OPG during the EA process were consolidated in the DNNP Commitments Report.
- OPG selected the BWRX-300 SMR in Dec 2021 for deployment at the DNNP site. OPG had committed to complete the following after selection of the reactor technology:
 - an assessment of effects for the BWRX-300 parameters that were not within the PPE
 - a review of the EIS for the deployment of BWRX-300 to ensure that the results of the EIS remain valid





DNNP Review of PPE

- The 2009 EIS was based on 198 design parameters known as the PPE and derived from multiple reactor technologies.
- OPG's PPE report was updated to include the BWRX-300 technology.
- Nine BWRX-300 values were not within the original PPE.
- An assessment of effects of these nine values was undertaken to determine whether the EIS conclusion remained valid:
 - there are no residual adverse effects



DNNP PPE Review – Summary of Results

Parameter	Review Result
<p>Fire Protection System:</p> <ol style="list-style-type: none">1. Short-term withdrawal rate from the water source2. Quantity of water stored	<p>While the short-term withdrawal is higher, the overall BWRX-300 water use is lower. The higher quantity of stored water has no impact on EIS conclusions.</p> <p>No residual adverse effect</p>



DNNP PPE Review – Summary of Results

Parameter	Review Result
Structure: 3. Deeper foundation embedment of reactors	Change in groundwater flow would occur temporarily during the construction period, while the 2009 EIS assumed a permanent change in groundwater flow. No residual adverse effect



DNNP PPE Review – Summary of Results

Parameter	Review Result
<p>Solid Waste and Used Fuel:</p> <ul style="list-style-type: none">4. Activity by isotope in solid radioactive waste5. Heavier cask to transport used fuel on site	<p>Handling equipment for waste containers will be adapted to manage activity</p> <p>On-site haul roads will be upgraded to accommodate cask</p> <p>Further analysis determined the solid waste generated by the BWRX-300 has less radioactivity annually, the same principal radionuclides, and less annual volume</p> <p>No residual adverse effect</p>



DNNP PPE Review – Summary of Results

Parameter	Review Result
6. Slightly lower importance factor for wind load used to develop plant design for safety related structures	The codes and standards for this parameter have been updated since the PPE was developed. This parameter is technology neutral. No residual adverse effect



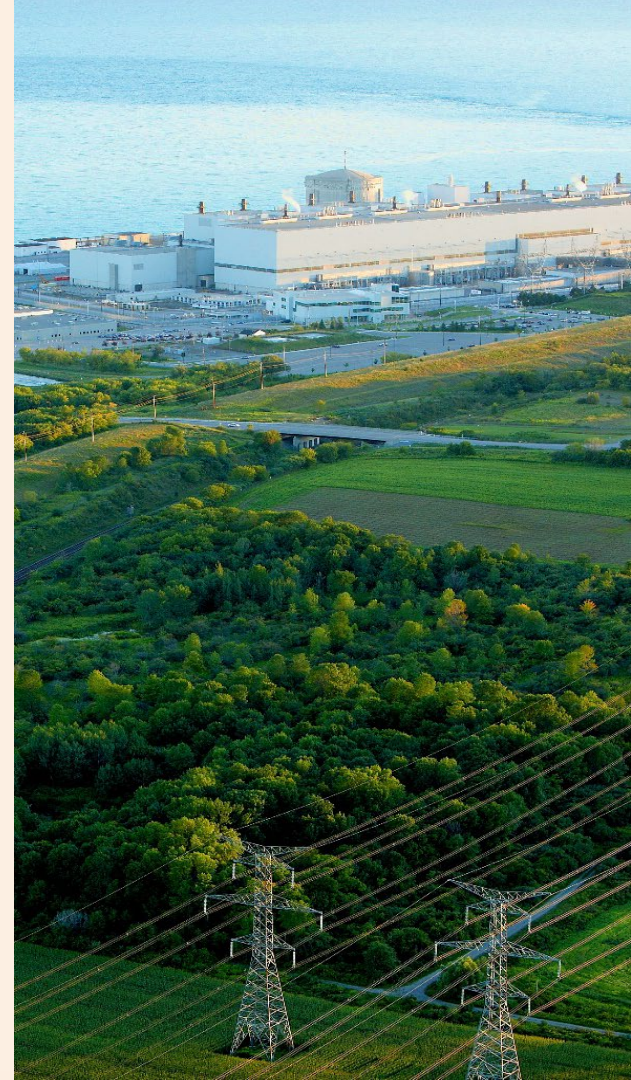
DNNP PPE Review – Summary of Results

Parameter	Review Result
<p>Airborne and Waterborne Releases during normal operation</p> <ul style="list-style-type: none">7. Lower minimum release height above finished grade8. Activity by isotope of airborne releases9. Activity by isotope of waterborne releases	<p>Doses to public from airborne and waterborne releases are below regulatory limits</p> <p>No residual adverse effects</p>



DNNP Comprehensive Review **of the 2009 EIS**

1. Review of project work and activities
2. Review of existing environmental conditions
3. Review of effects on valued ecosystem components (VECs) and new receptors
4. Review of significance of residual adverse effects
5. Review of follow-up program
6. Review of effects of the environment on the project
7. Review of malfunctions, accidents, and malevolent acts
8. Review of cumulative effects





DNNP EIS Review – Summary of Results



1. Review of Project Work and Activities

- Works and activities associated with the deployment of the BWRX-300:
 - Smaller in scale and construction footprint – reduced on site traffic, excavated soil and rock, resulting in less noise, and dust during construction, and opportunities to retain on-site aquatic and terrestrial habitat.
 - No requirement for lake infill and no requirement for cooling towers.

2. Review of Existing Environmental Conditions

- Current baseline environmental conditions (from routine programs) were reviewed against EIS:
 - Two fish species (Lake Sturgeon and American Eel) have become listed provincially as endangered under Ontario's Endangered Species Act
 - Change in conservation status of several terrestrial and aquatic species (e.g., Bank Swallow)
 - Identification of new mammal species (Bats)
- Results of review are independent of reactor technology and are considered in the assessment of effects on VECs.



DNNP EIS Review – Summary of Results

3. Review of Likely Environmental Effects

- Review of likely effects of DNNP on the environment considering updated baseline and project works and activities
- Considered mitigation measures to reduce or eliminate environmental effects
- Identified effects that remain after mitigation – residual effects

Residual Adverse Effect	Relevant VECs
No residual adverse effects	<ul style="list-style-type: none">• Noise and dust• Surface Water Environment• Soil quality, groundwater quality and flow• Radiation & Radioactivity Environment• Traffic & Transportation• Physical & Cultural Heritage Resources• Human and Ecological Health
Residual adverse effect (Anticipated to be less than that described in the EIS)	<ul style="list-style-type: none">• Aquatic habitat and biota• Breeding birds – four reactors (<i>similar effect</i>)• Community and recreational facilities; use and enjoyment of property



DNNP EIS Review – Summary of Results

3. Review of Likely Environmental Effects – Continued

Residual Adverse Effect	Relevant VECs
Opportunity area to retain more on-site habitat Will be monitored and tracked Impacts will be mitigated as per existing program and plans	<ul style="list-style-type: none">On-site aquatic habitat (ponds and wetlands) *Vegetation communities (wildlife habitat), rare plant species, amphibians and reptiles, migrant butterfly stopover areas, dragonflies and damselflies, bats, breeding birds (Bank Swallows) *
None (No longer applicable to BWRX-300)	<ul style="list-style-type: none">Bird strikes due to cooling towersVisual aesthetics, community character, use and enjoyment of property due to cooling towers
<p>* Notes:</p> <ul style="list-style-type: none">Additional studies completed – effects from dust, noise, hydrology/hydrogeology were evaluated and are anticipated to be minorMitigative measures are available to eliminate or reduce residual adverse effects	



DNNP EIS Review – Summary of Results

3. Review of Likely Environmental Effects – Continued

- Indigenous Rights and Interests:
 - Ongoing
 - OPG will continue to work with Indigenous Nations and communities to appropriately identify any rights impacted by the project, and to work toward mitigation measures and/or accommodation.

4. Review of Significance of Residual Adverse Effects

- Each residual effect was evaluated using criteria required by CEAA and engagement activities
- All residual adverse effects determined to be not significant



DNNP EIS Review – Summary of Results

5. Review of Follow-Up Program

- The EA follow-up activities remain suitable for the deployment of BWRX-300

6. Review of Effects of the Environment on the Project

- No significant residual adverse effects of the environment on the Project anticipated following the consideration of design and mitigation features
- Determinations made in the EIS apply to the BWRX-300 deployment



DNNP EIS Review – Summary of Results

7. Review of Malfunction, Accidents, and Malevolent Acts

- No significant residual adverse effects anticipated from any malfunctions and accidents related to BWRX-300 deployment
- No new scenarios for malfunctions and accidents with BWRX-300 reactor

8. Review of Cumulative Effects

- No significant residual adverse effects are likely with the BWRX-300 deployment
- Cumulative effects of the cooling towers considered in the EIS are not applicable to the BWRX-300 deployment



Conclusions

- Overall, the review has determined that the conclusion of the 2009 EIS remains valid for the deployment of the BWRX-300 at the DNNP site:
 - assessment of nine BWRX-300 parameters that were not within the PPE shows that they do not alter the conclusion of the EIS
 - the works and activities for the BWRX-300 deployment are essentially the same as those evaluated in the EIS
 - the BWRX-300 has a smaller footprint, which results in opportunities to retain terrestrial habitat that were originally assumed to be removed
- With the implementation of mitigation measures, the DNNP is not likely to cause significant residual adverse environmental effects:
 - environmental effects are expected to be less than what was assessed in the 2009 EIS
 - EA follow-up will confirm conclusions of EIS

