Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 24-H2.1A

File / dossier : 6.01.07
Date: 2023-12-20
e-Doc: 7192042

Supplementary Information

Presentation from Ontario Power Generation Inc.

Renseignements supplémentaires

Présentation d' Ontario Power Generation Inc.

In the Matter of the

Ontario Power Generation Inc.

Applicability of the Darlington New Nuclear Project environmental assessment and plant parameter envelope to selected reactor technology

Commission Public Hearing

January 2024

À l'égard d'

Ontario Power Generation Inc.

Applicabilité de l'évaluation environnementale et de l'enveloppe des paramètres de la centrale à la technologie de réacteur sélectionnée pour le projet de nouvelle centrale nucléaire de Darlington

Audience publique de la Commission

Janvier 2024

Canada

Applicability of the DNNP Environmental Assessment and PPE to selected Reactor Technology

CMD 24-H2-1A

January 2024 • Mark Knutson, SVP Enterprise Engineering and Chief Nuclear Engineer

Territory Acknowledgement

Today's Agenda

01 Opening Remarks

02 Darlington New Nuclear Project

03 Plant Parameter Envelope

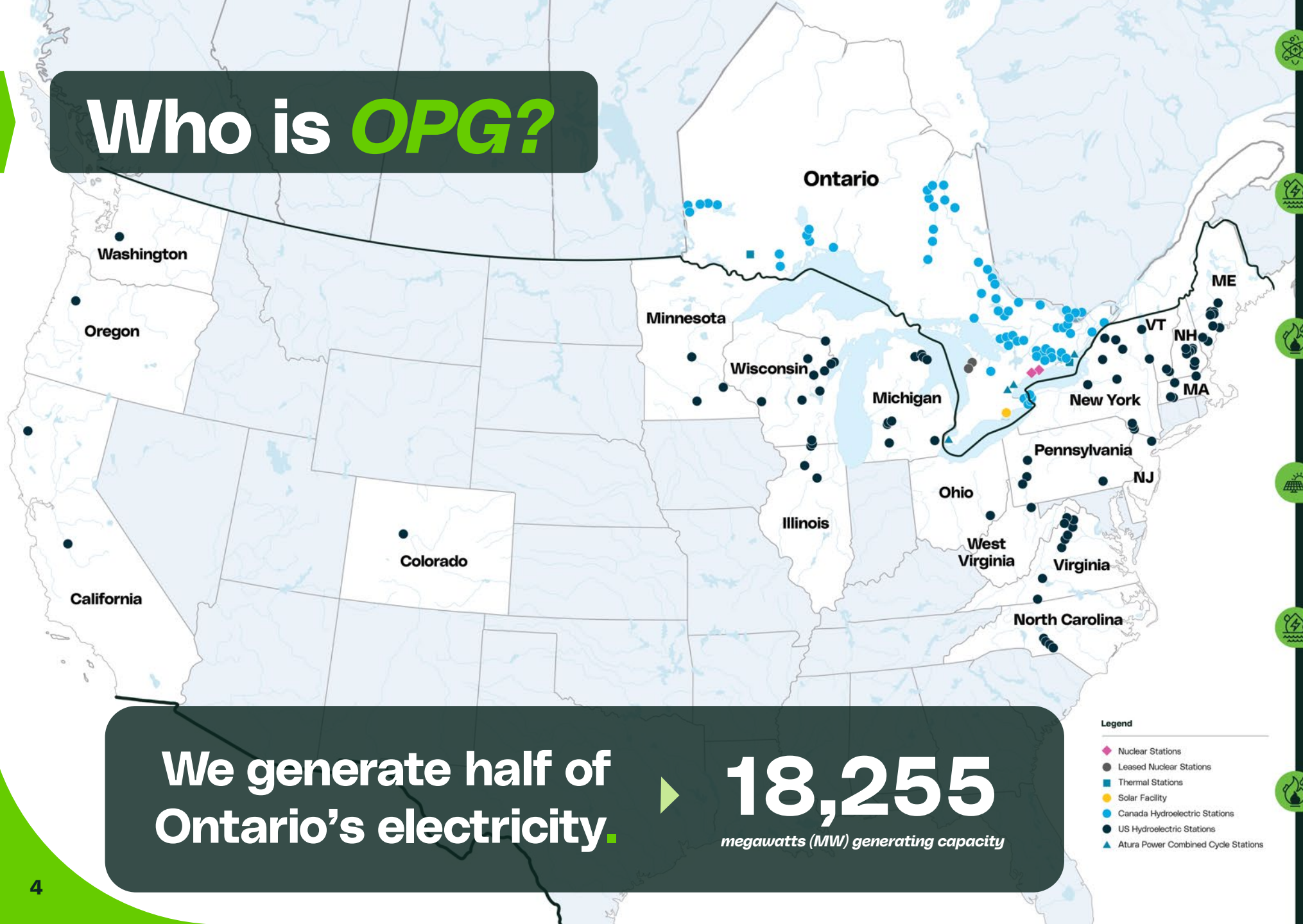
04 Environmental Impact Statement Review

05 Indigenous Engagement

06 Community Engagement

07 Overall Conclusion

Who is *OPG?*



We generate half of Ontario's electricity.

18,255
megawatts (MW) generating capacity

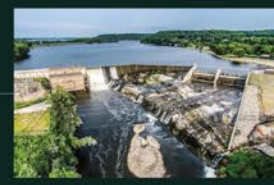
2
Nuclear Generating Stations

66
Hydroelectric Generating Stations in Canada

2
Thermal Stations

1
Solar Facility

85
Hydroelectric Generating Stations in the U.S.



4
Atura Power Combined-Cycle Generating Stations

OPG

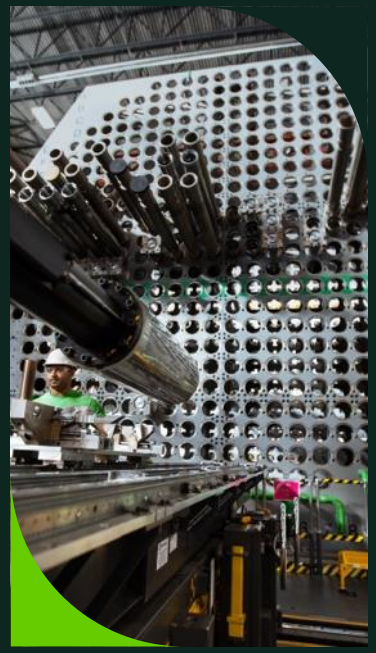
OPG's Environmental *Stewardship*

Our ongoing commitment to sustainable operation.

Continually strive to maintain or enhance significant natural areas

Our key *climate change actions*

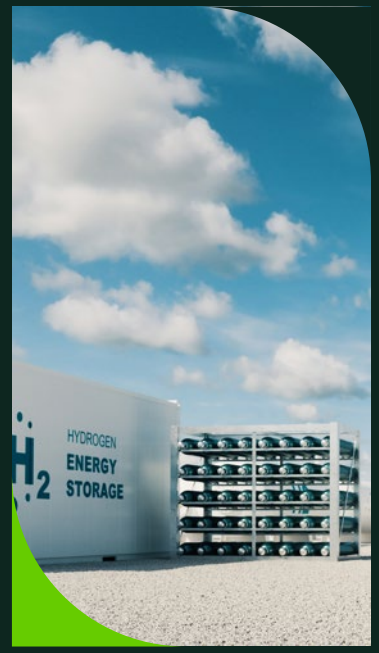
SMR development



Darlington Nuclear Refurbishment

Investing in new and existing hydro

Energy storage



Low-carbon hydrogen

Electrification initiatives

Small Modular Reactors

- A type of advanced nuclear reactor, the **next evolution of nuclear energy**
- Designed to be smaller in size than a traditional reactor, but also produce **safe, reliable, clean energy**
- Based on the **same science** as larger reactors, **different applications** (e.g., on-grid, off-grid, advanced)
- **Based on technology** that has existed around the world for 50+ years

Conceptual rendering of BWRX-300

Darlington New Nuclear Project

Karim Osman
Director, Engineering

Darlington New Nuclear Project site during site preparation work

How Did We Get Here?

2011

- **Joint Review Panel** Hosted **Public Hearings** on the Environmental Assessment

2012

- Government of Canada **accepted** recommendation from Joint Review Panel and the **Environmental Assessment**
- **CNSC issued** Licence to Prepare site- *Power Reactor Site Licence (**PRSL**)*

2013-2020

- **2013:** DNNP project is deferred by **Provincial Government**
- **2020**: OPG formally resumed **project-planning** activities for DNNP
- **2020**: OPG submitted application to renew **PRSL**

2021

- CNSC grants 10-year **PRSL**
- OPG selects the **BWRX-300**

2022-2023

- **Site Preparation** activities begin
- OPG submits **Licence to Construct (LTC) Application**
- Ontario Gov't announces OPG is to commence planning and licensing for **three additional SMRs** at DNNP site

Darlington New Nuclear Project

GE Hitachi: BWRX-300

Darlington Site
1 Holt Rd South, Bowmanville ON Canada

Darlington New Nuclear Site
to the East of the Darlington Station

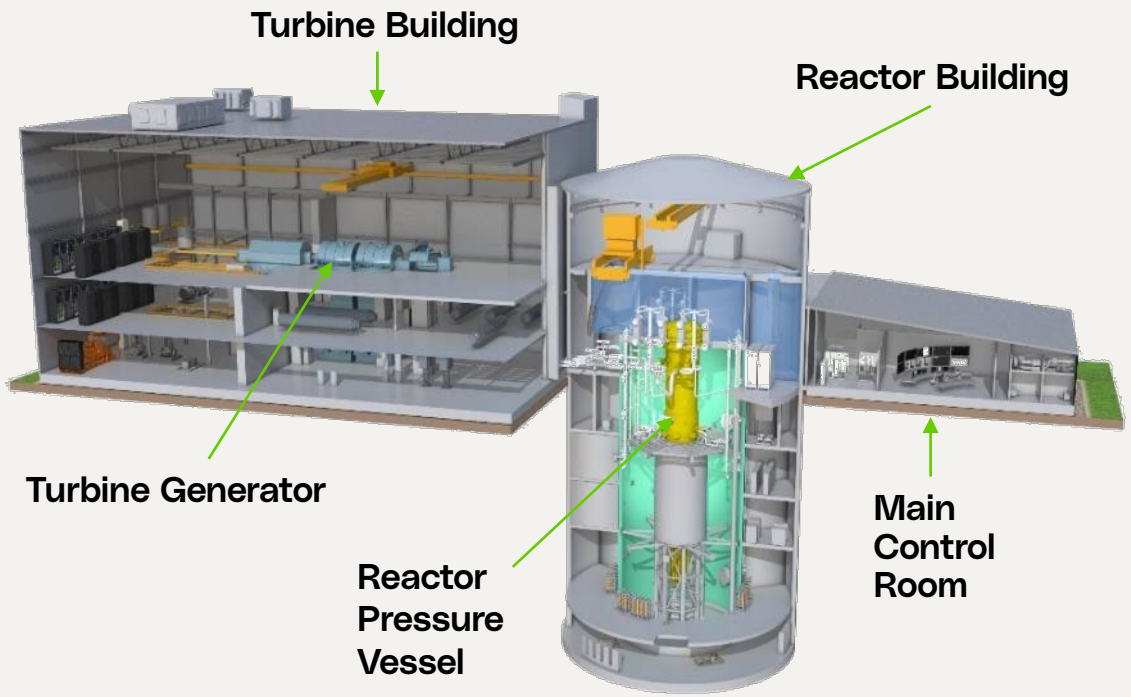
Darlington is the only licensed site in Canada for new nuclear build with an **accepted Environmental Assessment**

Technology Selection
Assessment Considerations

- **2019 to 2021**: OPG considered three Small Modular Reactor technologies and associated developers
- Utilized an extensive **multi-faceted technology selection** process
- Considerations of developers and their technology in **11 different areas**
- **The GE Hitachi BWRX-300** Small Modular Reactor was selected as the DNNP reactor technology

Technology Overview

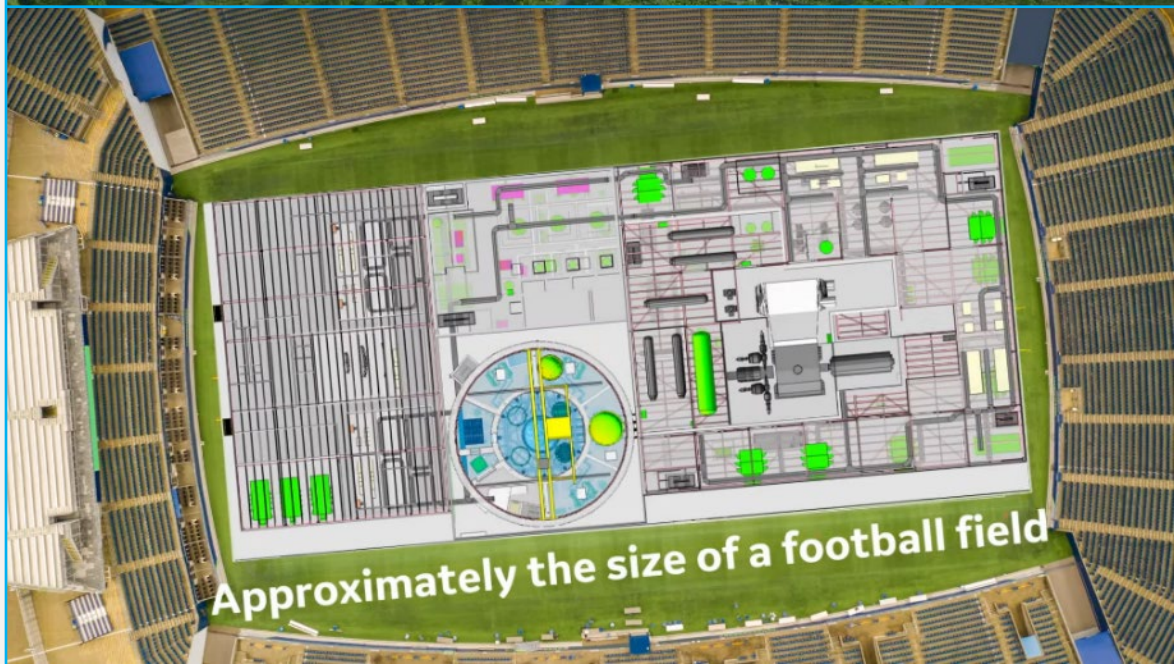
GE Hitachi: BWRX-300



Designed for a 60-year operational life

~300 megawatts, enough to power 300,000 homes

Boiling water reactor using natural circulation



GEH SMR Technologies Canada is the Canadian division of the world-leading provider of reactor technology and nuclear services.

Darlington New Nuclear *Project*

Estimated Project Timeline

2024

- CNSC Public Hearing for **Licence to Construct**
- Pending hearing outcome, **Licence to Construct** Issued

2028

- CNSC Public Hearing for **Licence to Operate**
- Pending hearing outcome, Licence to **Operate Issued**

2029

- **Construction complete** by end of 2028
- **Commercially available** by end of 2029

2034-2036

- Subject to Regulatory Approvals, **Commercial Operation of Unit 2-4**

All dates are based on current project schedules*

Site Preparation Work

- Clearing and Grubbing
  Complete
- Design Activities for Site Grading and Storm Water Features
  Complete
- Excavation of Spoils
  In-progress
- Construction Power & Communications Installation
  In-progress

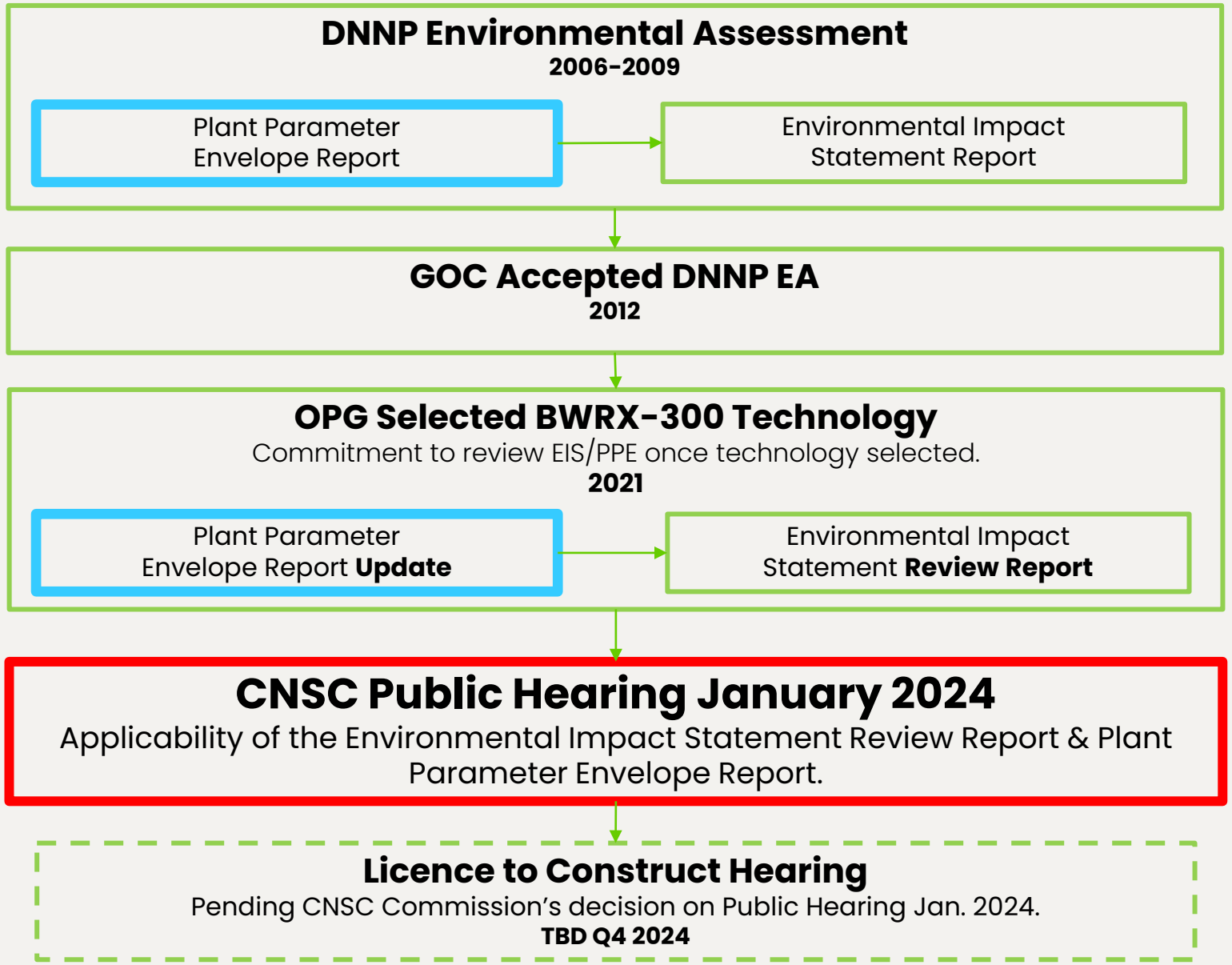
Darlington new nuclear site as of October 2023

Plant Parameter Envelope

Karim Osman
Director, Engineering

Environmental Assessment

- **Four** units up to **4,800 megawatts**
- **Plant Parameter Envelope (PPE)** based on bounding conditions from multiple reactor technologies



PPE Review BWRX-300

The BWRX-300 was compared to the PPE used in the 2009 Environmental Impact Statement (EIS).

8 of 198 BWRX-300 values were outside the original PPE and were assessed & confirmed to not impact the conclusions of the EIS.

1. Fire Protection, short-term withdrawal rate from the water source
2. Fire Protection, quantity of water stored
3. Reactor Embedment
4. Spent Fuel Cask Weight
5. Importance Factor for Wind Load
6. Lower Minimum release height above finished grade
7. Activity by isotope of airborne releases
8. Activity by isotope of solid radioactive waste

PPE Review
Summary of Results

Parameter 1: Fire Protection, Short-term withdrawal rate from the water source

- While the short-term withdrawal is higher, the overall BWRX-300 water use is lower
- No impact on EIS conclusions

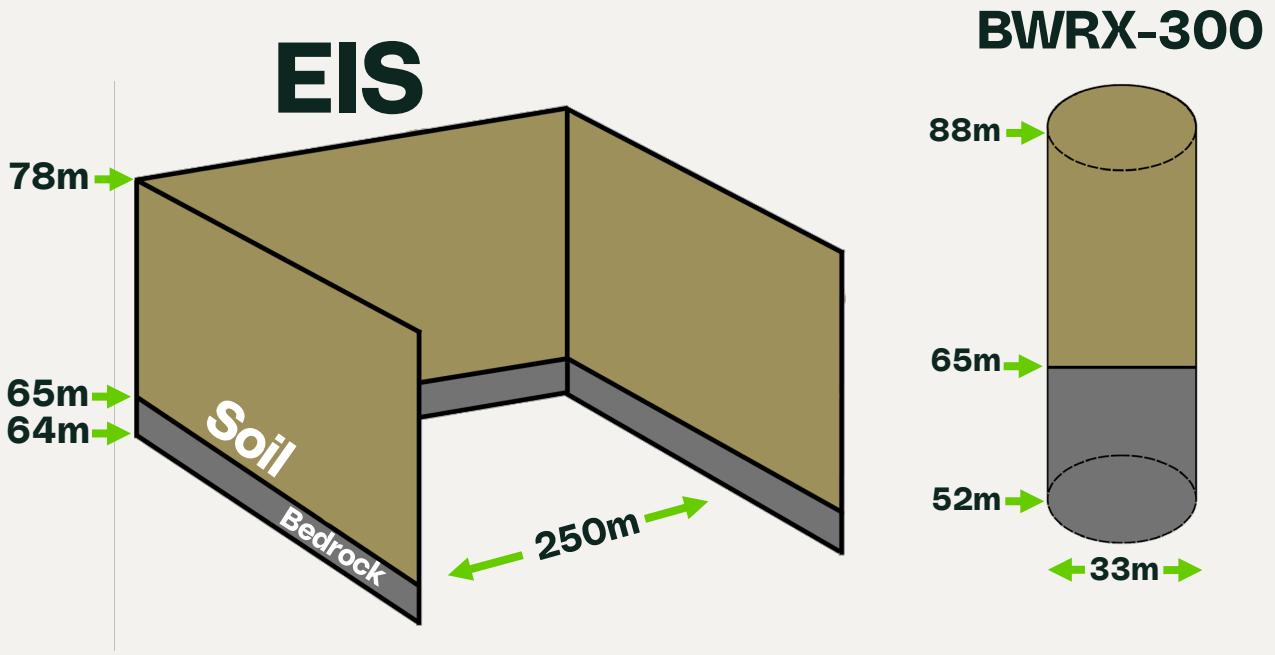
Parameter 2: Fire Protection, quantity of water stored

- The quantity of stored fire water is used for information purposes only and a higher value has no impact on the EIS conclusions
- No impact on the EIS conclusions

PPE Review Summary of Results

Parameter 3: Reactor Embedment

- Modeling showed a temporary change in groundwater flow would occur during the construction period near the reactor building, while the 2009 EIS assumed a permanent change in groundwater flow on site
- No impact on EIS conclusions



PPE Review
Summary of Results

Parameter 4: Heavier cask to transport used fuel on site

- On-site haul roads will be designed to accommodate cask. No impact to the EIS conclusions

Parameter 5: Importance factor for wind load

- The codes and standards determining wind load have been updated since the PPE was developed. Wind loads calculated to the latest codes and standards have no impact to EIS conclusions

PPE Review
Summary of Results

Parameter 6: Lower minimum release height above finished grade

Parameter 7: Activity by isotope of airborne releases

Parameter 8: Activity by isotope of solid radioactive waste

- These three parameters are used in calculations of doses to the public and workers
- Dose results meet the same dose criteria and were within regulatory dose limits
- No impact on EIS conclusions

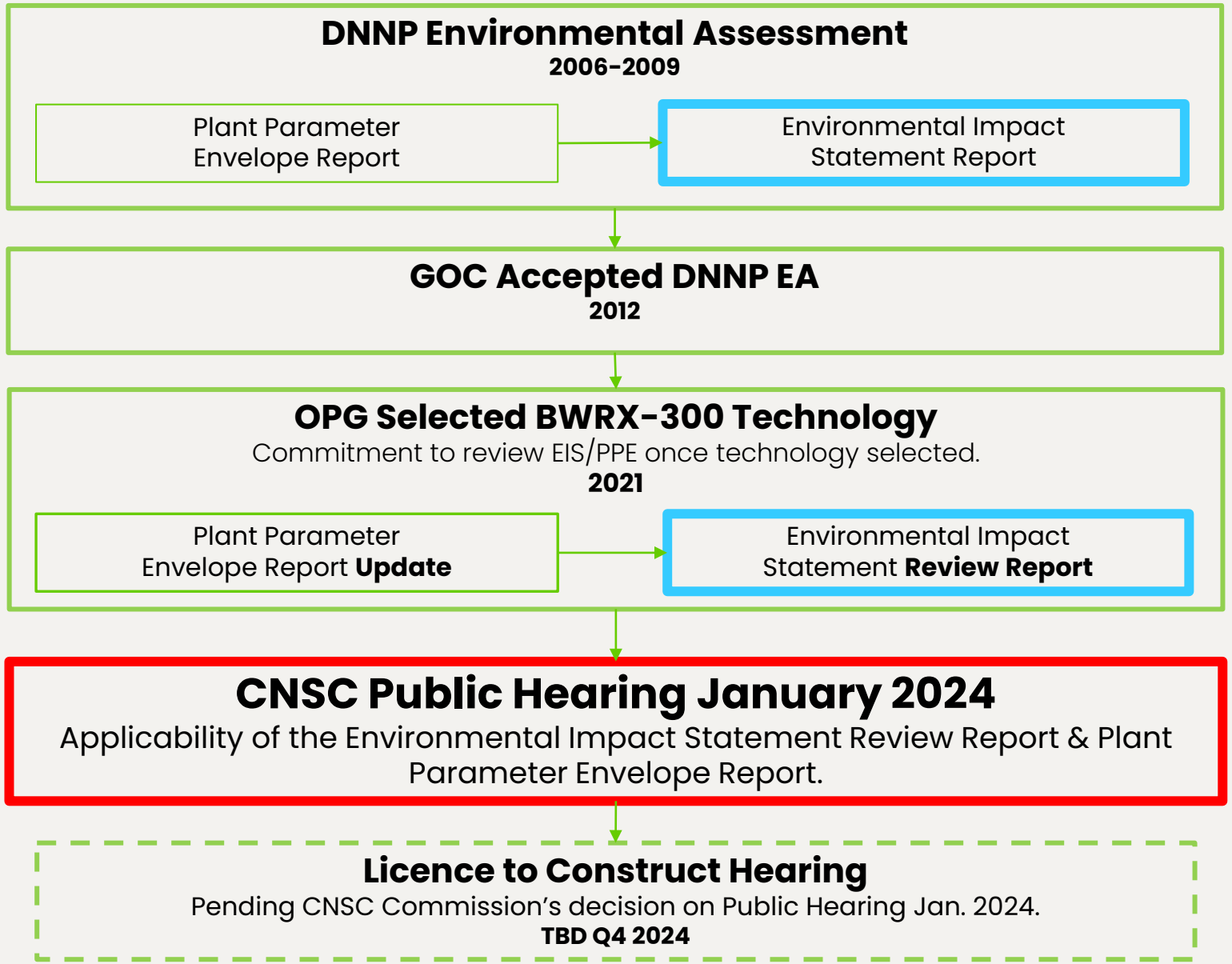
EIS Review

Cammie Cheng

Senior Manager, Environment, Health & Safety

Environmental Assessment

- **Four** units up to **4,800 megawatts**
- Assess if **EIS** conclusions remain valid for BWRX-300 units



EIS Review Approach

01 Description of Project

02 Baseline Characterization

03 Identification of Project-Environment Interactions and Assessment of Likely Effects

04 Consideration of Mitigation Measures

05 Identification of Residual Adverse Effects

06 Assessment of Cumulative Effects

07 Evaluation of Significance of Residual Adverse Environmental Effects

08 Development of Preliminary Plan for EA Follow-Up Program

Engagement and Consultation

OPG

EIS Review *Approach*

All of the environmental components assessed in the EIS were reviewed:

- **Atmospheric** Environment
- **Surface Water** Environment
- **Aquatic** Environment
- **Terrestrial** Environment
- **Geological** & **Hydrogeological** Environment
- **Radiation** & **Radioactivity**
- **Land Use** Environment
- **Traffic** and **Transportation**
- **Physical** & **Cultural Heritage** Resources
- **Socio-Economic** Environment
- **Indigenous Interests**
- **Health – Humans**
- **Health – Non-Human Biota**

Summary of *Results*

- BWRX-300 deployment has a smaller footprint (physical size and electrical power).
- Construction requires reduced workforce, on site traffic and excavation of soil and rock.
- Opportunity to retain on site ponds, wetlands, vegetation habitats and shoreline habitat.


Darlington New Nuclear Site


Treefrog pond on Darlington New Nuclear Site

Summary of *Results*

- BWRX-300 deployment utilizes once-through lake water cooling.
  - Cooling water flow rate for the BWRX-300 is substantially lower than that assessed in the EIS, therefore will result in lesser effects.

- BWRX-300 will be operated such that no radiological liquid effluent is released during normal operation of the facility.

Summary of *Results*

- The BWRX-300 will require less marine and shoreline work.
- Deployment of BWRX-300 does not result in any major changes to the Environmental Assessment follow-up and monitoring program.

Meadow habitat at Bobolink Hill on Darlington site

2019 flow measurements from the mouth of Darlington Creek

Ongoing *Activities*

- Continued implementation of Environmental Monitoring and Environmental Assessment follow-up program in accordance with OPG's Environmental Management System:
  - Verify Environmental Assessment predictions and effectiveness of mitigation measures.
  - Adaptive management continues to be inherent in design and implementation of follow up activities.
- Site specific environmental management plans to support the project activities.

Indigenous Engagement

Katie Haddlesey
Director, Indigenous Partnerships

OPG's Tuesdays on the Trail
Community Programming

Commitment to Indigenous Nations & Communities

- OPG is committed to working with Indigenous communities to develop positive relationships and generate shared social and economic benefits through our Reconciliation Action Plan.
- We strive to build relationships based on the principles of respect, integrity and mutual responsibility.
- While we have made progress, we recognize that we still have a lot to learn.

Archaeological liaison training - Trent Graduation

The Reconciliation Action Plan refresh focus on key pillars: Leadership, Relationships, People, Economic Empowerment, and Environmental Stewardship

Reconciliation
Action Plan

This is our road map to meaningfully advance Reconciliation with Indigenous Nations and communities, businesses, and organizations.

OPG

The history of Indigenous Engagement

Engagement and Knowledge Sharing Experiences

2006 - 2023

- Conversations began regarding Treaty acknowledgements and site signage.
- Discussions took place regarding the Indigenous Opportunities Network (ION), employment and supply chain and capacity building.
- Focused monthly permitting meeting
- Events and ceremonies.

- Relationship building remains our priority: community events, monthly meetings with Rightsholders, quarterly meetings with Interest Holders.
- Knowledge-sharing and education through community events, ceremony and presentations (initiated in 2020).
- Listening to develop and improve our pathway forward.

OPG

The future of Indigenous Engagement

Where we are going

2024

- Undertake an Indigenous Knowledge Study scoping exercise with WTFN.
- Opportunities for further environmental engagement.

- Capacity agreement review.

- Environmental monitoring augmentation plans to provide an Indigenous knowledge view.
- Restoration planning.

- Initial Rights Impact Assessment results.

Indigenous Engagement

Agreements and Relationship with Rightsholders (to date)

Rightsholder	Agreement Type	Date Signed
Curve Lake First Nation	Capacity Funding Agreement	January 31, 2023
	Framework Agreement	August 2, 2021
Mississaugas of Scugog Island First Nation	Capacity Funding Agreement	July 13, 2023
Hiawatha First Nation	Capacity Funding Agreement	February 13, 2023

Future Opportunities:

- Commercial participation options
- Earlier engagement with options to be on site in a meaningful way
- Restoration planning
- Participation from additional Rightsholders

Indigenous Engagement

OPG continues to learn and improve our process to meet the needs of the Rightsholders.

Recent improvements to OPG processes:

- **Expanded Indigenous Relations Team**
- **New training and knowledge sharing processes:**
  - Multi-level Indigenous Relations training
  - Knowledge-sharing journey with the Rightsholders
  - Required reading for team members
- **Strengthening** ongoing **integration planning**
- **Growing** opportunities in **Indigenous employment** and **supply chain participation.**

Alderville First Nation
Pow Wow 2023

Community Engagement

Mark Knutson
Senior Vice President , Chief Enterprise Engineering and Chief Nuclear Engineer

OPG's 2023 Community Power Expo at Darlington

Commitment to Community Engagement

Comprehensive outreach and communications program since 2006:

- **Keeping our communities informed** through community council and committees.
- **Educational programs** and events.
- **Tours** and **presentations**.
- **Environmental Stewardship**.
- **Community programming** and **partnerships**.


Planting shrubs


OPG's March Break Program


OPG's 2023 Community Power Expo


OPG at the Oshawa Mall 2023

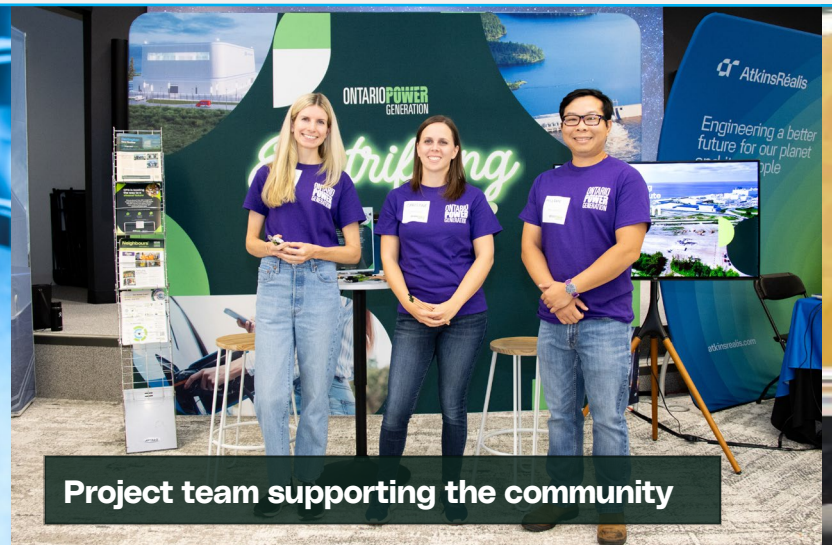
OPG at the Celebrate Sport in Clarington

DNNP *in the Community*

- **Community Power Expo** – 3500 visitors
- **Neighbours Newsletter** – 250k recipients
- **Fall Council and Committee Updates**
- **Public Information Sessions**
- **Community Kiosks & events –** 10,000+ engagements
- ***Electrifying Community*** Speaker Series

2023 Community Power Expo


Touring the BWRX-300



Project team supporting the community

UPDATE WITH BUILD WHAT YOU CAN PHOTO 2023

Overall *Conclusion*

The choice of the BWRX-300 does not alter the conclusion of the EIS.

Smaller footprint + smaller physical size + plant design features
= BWRX-300 having a smaller impact on the environment.

The 2009 EIS remains valid for deployment of the BWRX-300 at Darlington Nuclear

→

The DNNP Environmental Assessment is applicable to the BWRX-300

Electrifying life

OPG