BrucePower

ONTARIOPOW
GENERAT

**November 11, 2019**

Hon. Greg Rickford,
Minister of Energy, Northern Development and Mines
Whitney Block, Room 5630 5th floor
99 Wellesley St. W. Toronto ON,
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Hon. Bill Walker
Associate Minister of Energy
Whitney Block, Room 5630 5th floor
99 Wellesley St. W. Toronto ON,
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Dear Ministers,

Three years ago, Ontario Power Generation's (OPG) team of project partners, industry experts, energy professionals, and skilled tradespeople successfully began Darlington's Unit 2 reactor refurbishment. Likewise, in 2016, Bruce Power's Life Extension Program started, and has progressed on time and on budget with nearly $1.9B in inspections and projects completed.

Darlington Unit 2 is only the start. A total of 10 refurbishments will be completed in Ontario over the next 14 years. In a few short months, the next phase of Bruce Power's Life Extension Program starts with the first Major Component Replacement (MCR) on Unit 6 in tandem with Darlington's second refurbishment of Unit 3. Our staggered, 13-year project schedule gives us time to find efficiencies and lower costs, and our companies have enthusiastically accepted this challenge. We've achieved collaboration and innovation in Engineering, Procurement, and Construction, Training process improvements, project risk reduction, dose reduction, and exchange of project operational experience (OPEX) and lessons learned.

Both projects have benefitted from lessons learned on OPG's Unit 2 refurbishment, which has enabled the teams to implement design changes to improve technology and critical path workflow. Project installation and inspection tooling has been a point of convergence this year for the teams. The leak test tooling, installation work table, and conditioning tool have all seen incremental improvements as a direct result of information sharing and lessons learned. The bellows cut tool was also modified to improve outcomes. Minor changes to the tool's speed and cutter heads produced more efficient outcomes and will reduce the need for rework during critical path activities.

Significant progress has been made on the waste management and storage solutions for Bruce Power's MCR project. OPG's Western Waste Management Facility (WWMF) will support Bruce

Power's upcoming refurbishment by providing interim storage and processing for low- and intermediate-level nuclear waste. As such, we've recognized this as a primary integration point for our companies.

In late 2018, stakeholders from Bruce Power and OPG met for the first Nuclear Waste Management Summit. The group reviewed items including storage and handling, potential risks, opportunities for waste reduction, and how to manage peak scheduled waste times. The MCR Waste Working Team was developed to overcome challenges with the retube waste container design and to maximize storage space at OPG's waste facility. They developed a new retube waste container with enhanced radiological shielding that allows for three-high stacking, and implemented other simple solutions to increase storage capacity and, as a result, were able to defer construction of a new facility.

There's a common thread that binds our organizations and that is: the success of one begets the success of its counterpart. It's encouraging to see our employees take this adage to heart as they work together to mitigate project risks, implement lessons learned and optimize results on both sides. For example, OPG began its feeder weld testing by performing phased array ultrasonics, but converted to radiography after it was deemed a superior method. Bruce Power adjusted its plan for the Unit 6 refurbishment based on OPG's findings.

Collaboration is also at the heart of our efforts to ensure sufficient skilled trades to undertake the work required. The Bruce Power MCR program will secure an estimated 22,000 jobs directly and indirectly from operations, and an additional 5,000 jobs annually throughout the investment program, injecting billions into Ontario's economy. For OPG over 14,200 jobs will be realized during the project and over the life of the Darlington extended operations. During overlap periods, when multiple units are being refurbished, an additional 4,000 plus trades will be required to power our projects forward. Both Bruce Power and OPG are developing collaborative partnerships with the Ontario construction building trades; government agencies; indigenous communities; and educational institutions to actively promote, attract and train skilled workers.

Our project leadership teams discuss schedule, risks, and performance on a bi-weekly basis and we've had a number of employees accept secondments that have proven advantageous to both parties. By embedding themselves in their industry peer team, they were able to capture nuanced insights and act as intermediaries for their colleagues. Bruce Power's process for handling project documentation was enhanced as a result of secondment feedback. This program has been a key element of the Bruce Power-OPG collaboration and we'll continue to encourage and support these types of activities. Our teams have also reached beyond our Canadian borders to gain lessons learned and insights from the recently completed Embalse refurbishment in Argentina.

Our organizations have also jointly collaborated with CANDU Owners Group (COG), a not-for-profit funded by CANDU operators, on research and innovations that are contributing to stronger operations on both our sites. One such research project allowed us to better manage and extend the life of fuel channels in a CANDU reactor. Through these findings, we were able to prolong the life of our nuclear units prior to refurbishment. Another COG-led project resulted in

a fuller understanding of pressure tube behaviour, which has improved plant predictability and reliability. These successful collaborative ventures have contributed billions of dollars back to Ontarians in additional electricity generation and use of these assets. We're proud of the work are teams are doing in the R&D space and will continue to seek out efficiencies that benefit our sites and the province.

In 2023, Bruce Power and OPG will have five combined refurbishments ongoing, which will put our abilities to the test. Our refurbishments are the largest infrastructure projects in Canada and combined are creating more than 35,000 direct and indirect jobs across the province. With the demand for skilled trades on the rise, our organizations have been working to build skilled trades capacity. From grassroots initiatives in our local communities to partnerships with Skills Ontario, we are collaborating to ensure the capacity exists to support the largescale nuclear and non-nuclear projects occurring in Ontario.

As outlined in the Auditor General's report, skilled trades are viewed as a potential risk to both refurbishments as well as a number of other critical projects throughout the country. In 2019, OPG partnered with Durham College and the International Brotherhood of Boilermakers to develop a pre-apprenticeship program that trained 100 students that are now available to work in the nuclear industry as Boilermaker apprentices. These new recruits will be available when both OPG and Bruce Power enter into overlapping unit refurbishments. In addition, Bruce Power partnered with Georgian College to develop a new pre-apprenticeship program that will encourage more young people to enter the trades. The Georgian College program is a 34-week program which gives students a hands-on introduction to five construction trades. A highlight of the program is the 12-week paid placement at Bruce Power with suppliers and unions where students are given an opportunity to put their classroom knowledge to the test. The pre-apprenticeship program was deemed a success in its first year and has since received the governmental approval and funding required to run again in 2020. Both OPG and Bruce Power continue to work with all trade unions, contract partners and the Electrical Power Systems Construction Association (EPSCA) on additional mitigation strategies relating to skilled trades demand.

We have over 480 Ontario companies or suppliers involved in our refurbishments providing economic development opportunities throughout the province. Many have secured long-term supply contracts that span the 14-year horizon. These contracts are enabling the recapitalization of the industry and the hiring of another generation of nuclear industry professionals. A number of suppliers are also collaborating to produce innovative new technologies that are used here and also exported to other countries.

Our companies are working collaboratively to maximize efficiencies for Ontario and deliver the projects safely, with quality on time and on budget. By taking a pro-active approach in applying lessons learned to date we are aligned around:

- Investing in our people: to build strong project managers and develop strong leadership capabilities.

- Owner oversight and involvement with our project partners and contractors to ensure commercial commitments are met.
- Maintaining a "Project-Centric" approach with clear lines of accountability and authority.
- Rigorous layered oversight at all levels of our organizations to ensure transparent and accurate information flows and resolution of issues and learnings shared.
- Build trusting collaborate relationships to drive for efficiencies and to maximize on opportunities.

The pathway to success is paved in innovation and collaboration and we are encouraged by the behaviours we see on a daily basis. Our teams continue to find efficiencies and work together to create the best possible outcomes for our refurbishment projects. Together, we'll work to provide the Province of Ontario with low-cost, carbon-free and reliable electricity for decades.

Sincerely,

Ken Hartwick
President and CEO
Ontario Power Generation

Mike Rencheck
President and CEO
Bruce Power