



Darlington Nuclear Generating Station Refurbishment Project

2018 Value-for-Money Audit

Why We Did This Audit

- In January 2016, Ontario Power Generation (OPG) publicly announced that it was ready to execute the Darlington Nuclear Generating Station Refurbishment Project (Project).
- The Project was estimated to cost \$12.8 billion, take 10 years (from October 2016 to February 2026) to complete the main refurbishment work, and extend Darlington Station's four nuclear reactor units until 2055.

Why It Matters

- Since Darlington Station generally produces over 15% of the electricity used in Ontario, the Project is important to Ontario's long-term energy supply.
- OPG is a corporation wholly owned by the Province that operates more than 60 hydroelectric stations and two nuclear plants: Darlington Station and Pickering Nuclear Generating Station.

What We Found

- Prior to starting the main refurbishment work, OPG had to carry out 18 prerequisite projects at a total cost expected to exceed \$725 million, or 75% more than its initial estimate. The main causes for the cost overrun include a lack of detailed planning and understanding of the work's complexity, resulting in inaccurate estimates and scoping; poor risk assessment; underweighting of technical criteria when selecting contractors; assignment of work to staff with limited relevant experience with that complex work; and poor project management and oversight of contractors.
- As of June 30, 2018, OPG forecast the Project will meet the time and cost estimates it publicly announced in January 2016. OPG has applied lessons learned from its early Project work to the remainder of the Project. However, there remain several significant risks, due to an increase in the Project's complexity, that could result in the Project going over its time and cost estimates. For example:
 - OPG has performed refurbishment work on only one reactor unit to date and may face more challenges when it starts working on more than one unit at the same time in 2021.
 - OPG will be in competition for skilled trades during several years when the Project will overlap with another refurbishment project at the Bruce Nuclear Generating Station. In particular, a potential shortage of boilermakers, a specialized trade that removes and installs nuclear reactor unit components, will pose the biggest risk.
 - OPG estimated that over 30% of the management staff and nearly all of the executives working on the Project will be eligible to retire by 2025, a year before its scheduled completion, which could potentially create a major staffing gap. OPG has not yet identified replacements for all of these potential retirees.
- OPG's costs have increased as a result of providing more assistance than expected to contractors not performing up to its expectations. While OPG estimated that it will spend overall almost \$50 million more on Project oversight and support (such as additional assistance to contractors) than it initially estimated, it has not yet factored the impact of this additional cost when determining the amount it pays the contractors.
- While there have been no serious injuries to Project staff, OPG has not met its safety targets, and the frequency of safety incidents has remained mostly unchanged since 2016 when the actual refurbishment started. OPG could have also been more proactive to try to reduce recurring preventable safety incidents. For example, an incident in November 2017 resulted in a contractor stopping its 800 staff from working on the Project for two days, which cost OPG over \$700,000. There had already been eight incidents that year with the same cause (workers had dropped tools and parts when working above ground).

Conclusions

- OPG faced significant challenges, cost overruns and delays in Project work begun prior to its public announcement in January 2016 that it was ready to execute the project (about five months after appointing a new President and CEO). It has applied lessons learned from that work to the remaining Project work and in the development of its cost and time estimates.
- A fair and transparent procurement process was generally followed in the selection of contractors.
- A clear accountability structure is in place to ensure that staff and contractors deliver services according to contract terms and standards and that their performance is monitored and appropriately addressed in a timely manner.
- Project timelines and costs are being managed, monitored and publicly reported on a regular basis, and corrective actions are being taken when issues arise.
- Given the complexity of the Project and risks associated with work not yet done, uncertainty still remains as to whether the Project will be completed on time and on budget.

Read the [Darlington Nuclear Generating Station Refurbishment Project](http://www.auditor.on.ca) audit report at www.auditor.on.ca