

Legislative  
Assembly  
of Ontario



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**Official Report  
of Debates  
(Hansard)**

P-11

**Journal  
des débats  
(Hansard)**

P-11

**Standing Committee on  
Public Accounts**

2018 Annual Report,  
Auditor General:

Ministry of Energy

Ontario Power Generation

1<sup>st</sup> Session  
42<sup>nd</sup> Parliament

Wednesday 10 April 2019

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Ministère de l'Énergie

Ontario Power Generation

1<sup>re</sup> session  
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Mercredi 10 avril 2019

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Chair: Catherine Fife  
Clerk: Christopher Tyrell

Présidente : Catherine Fife  
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# CONTENTS

Wednesday 10 April 2019

2018 Annual Report, Auditor General.....	P-181
Ministry of Energy; Ontario Power Generation.....	P-181
Ms. Bonnie Lysyk	
Mr. Stephen Rhodes	
Mr. Ken Hartwick	
Mr. Dietmar Reiner	



LEGISLATIVE ASSEMBLY OF ONTARIO

ASSEMBLÉE LÉGISLATIVE DE L'ONTARIO

## STANDING COMMITTEE ON PUBLIC ACCOUNTS

## COMITÉ PERMANENT DES COMPTES PUBLICS

Wednesday 10 April 2019

Mercredi 10 avril 2019

*The committee met at 1232 in room 151, following a closed session.*

### 2018 ANNUAL REPORT, AUDITOR GENERAL

#### MINISTRY OF ENERGY ONTARIO POWER GENERATION

Consideration of section 3.02, Darlington nuclear generating station refurbishment project.

**The Chair (Ms. Catherine Fife):** Good afternoon. Welcome to the Standing Committee on Public Accounts. We are here today to begin consideration of the Darlington nuclear generating station refurbishment project, which is section 3.02 from the 2018 annual report of the Office of the Auditor General.

Before we begin, I would just like to welcome senior staff from the Environmental Commissioner's office, and I'm going to ask the Auditor General to introduce you.

**Ms. Bonnie Lysyk:** Yes. Joining our office effective April 1 are senior people from the previous Environmental Commissioner's office. They will be working with us on compliance with the EBR environmental reports. I'll just introduce them. At the back we have manager Chris Wilkinson, we have Michelle Kassel, we have Nancy Palardy, we have Mike Parkes and we have Tyler Schulz. He is accompanied by the staff from this audit: Gigi Yip, Wendy Ng, Tom Fitzmaurice and Michael Yarmolinsky. Beside me I have Rudy Chiu. Welcome to their first meeting of the committee.

**The Chair (Ms. Catherine Fife):** Thank you, and welcome.

I would like to also welcome representatives from the Ministry of Energy and Ontario Power Generation. Thank you for being here today to answer the committee's questions. I would invite you each to introduce yourselves for Hansard before you begin speaking. You will have 20 minutes collectively for an opening presentation to the committee. We will then move into the question-and-answer portion of the meeting, where we will rotate back and forth between the government and the official opposition caucuses in 20-minute intervals. This week, we're going to begin with the government side.

Please introduce yourselves and begin your 20 minutes. You don't have to take all the 20 minutes if you don't want to, but we'll go from there.

**Mr. Stephen Rhodes:** Okay. Good afternoon, everybody. I'm Stephen Rhodes. I'm the deputy for energy. It's a pleasure to be here. Thank you for the opportunity. I'm accompanied by Ken Hartwick, the new president and CEO of OPG, but I know he'll do some introductions when I pass it over to him.

I'm also accompanied by Steen Hume, who is the assistant deputy minister responsible for the energy supply policy division within the ministry. He may be coming up to the table to answer the odd question, so I thought I should introduce him.

Let me begin by assuring the committee that energy, northern development and mines appreciates the Auditor General's report and the hard work that was done by her and her staff. We certainly appreciate that, and we are very aware of the importance of this refurbishment project. I want to assure the committee that every effort is being made on the part of the ministry, as well as OPG, to implement all of the recommendations that have been provided.

Before I turn it over to Ken, I just thought I'd reference a few other things, and then I'll let Ken move through his opening remarks. I thought I'd just stress that the ministry understands how important this particular project is—a very important priority for us, so much so that we get quarterly updates. Ken and I meet very regularly, as did Jeff Lyash and myself. Nuclear power currently supplies about 60% of the power used by all Ontarians every day. The 2017 Financial Accountability Officer of Ontario report on nuclear refurbishment confirmed that there's currently no portfolio of alternative low-emission generation that could replace nuclear generation at a comparable cost at the current time. So it's obviously a very important project for us, a very important project for the Ontario economy, contributing about, in total, \$90 billion to Ontario's GDP and employment of around 1,400 and 200 jobs annually. That being said, it's obviously very critical for us.

With that, I will certainly turn it over to Ken to give you a little bit more of an update, and then obviously be available to take any questions the members may have. Thank you very much for the time today.

**The Chair (Ms. Catherine Fife):** Mr. Hartwick.

**Mr. Ken Hartwick:** Good afternoon, Madam Chair and members of the Standing Committee on Public Accounts. Thank you for the invitation to appear before you today to discuss the Auditor General's report and the value-for-money audit on the Darlington refurbishment project.

My name is Ken Hartwick. I was appointed president and chief executive officer of Ontario Power Generation on April 1. Previously, I was chief financial officer at OPG, taking on this role in March 2016. My previous experience in the energy sector includes president and CEO of Just Energy, CFO at Hydro One in 2001 to 2004 and prior to this, I held positions at both Cap Gemini and Ernst and Young.

With me today is Dietmar Reiner, chief project officer, enterprise projects at Ontario Power Generation. Dietmar will be speaking to the details of the Darlington refurbishment. I will now turn it over to Dietmar to introduce himself.

**Mr. Dietmar Reiner:** Thank you very much, Ken. My name is Dietmar Reiner. As OPG's chief project officer, I have accountability for setting vision, establishing strategy and leading and planning execution of all major strategic projects at OPG. The Darlington refurbishment is one of these projects. I've been accountable for the Darlington refurbishment project since early 2010, when the project was first approved by OPG's board of directors and by the province. I joined Ontario Hydro, OPG's predecessor company, as an engineer back in 1985 and have held various senior-level positions in the company's nuclear and hydroelectric power systems, energy markets and corporate functions.

**Mr. Ken Hartwick:** Thanks. Maybe just for context, OPG is the largest power generator in Ontario, with a diverse generation fleet of 66 hydroelectric stations, two nuclear stations and three thermal stations. We provide approximately 50% of the generation in Ontario, at an average price 40% lower than the average price paid to other Ontario generators. OPG is the only generator in Ontario whose payments are regulated by the Ontario Energy Board.

OPG is 100% owned by the province, and the Ministry of Energy is the sole shareholder on behalf of the province. We are a major employer across the province, with approximately 9,200 staff, and we are a government business entity that operates on a commercial basis to deliver value to the province as shareholder and to Ontarians as customers.

Last year, OPG earned \$1.195 billion in net income, up from \$860 million in 2017, and OPG's net income is consolidated into the government's books.

OPG is also incorporated under the Ontario Business Corporations Act. Consequently, OPG's directors and officers are legally obligated to act in the best interests of the company. As a reporting issuer, OPG follows governance, reporting and disclosure requirements established by the Ontario Securities Commission. OPG's governance framework includes an independent board of directors appointed by the province and a memorandum of agreement between OPG and the Ministry of Energy.

In August of 2018, the Canadian Nuclear Safety Commission approved the extension of the licence for the Pickering nuclear station until 2028, which will allow for continued operations of Pickering until 2024 and the subsequent commencement of decommissioning activities. In addition, OPG has significant upgrades under way at several of our hydroelectric facilities.

## 1240

The subject of the Auditor General's report, the Darlington refurbishment project, will be addressed by Dietmar in greater detail. First, I would note that the project has been endorsed by several key independent reviews. An economic study prepared by the Conference Board of Canada found that refurbishment will increase Ontario's nominal GDP by a total of \$14.9 billion and by a total of \$90 billion, including the impact of 30 more years of station operation. For every one dollar spent on the project, Ontario GDP will increase by \$1.40. This is because 96% of the project costs are spent in Ontario and the heavy reliance on Ontario-based contractors. The project and ongoing operation of Darlington will create approximately 14,200 jobs per year from 2017 to 2055. Increased employment and GDP translate into increased income. Consequently, the project is expected to boost personal income by a total of \$61.4 billion between that same time period.

A study prepared by Intrinsic, an environmental consulting firm, found that over the 30-year life of Darlington post-refurbishment, Darlington's continued operations would reduce Ontario greenhouse gas emissions by 300 million tonnes. This is equivalent to the annual emissions from two million cars over 30 years.

In its November 2017 report on the financial risk of our nuclear refurbishment plan, the Financial Accountability Office of Ontario concluded that none of the alternative generation portfolios could provide the same supply of low-emission, baseload electric generation at a comparable price to the Base Case Nuclear Refurbishment Plan.

**Mr. Dietmar Reiner:** The \$12.8-billion Darlington nuclear refurbishment project is the largest clean-energy project in Canada. The four units of the 3,500-megawatt Darlington Nuclear Generating Station originally came into service between 1990 and 1993. Darlington has consistently been one of the highest-performing Candu nuclear stations worldwide. Its annual generation is equivalent to approximately 20% of the electricity consumed in Ontario, or enough to meet the electricity needs of a city of about two million people.

Candu nuclear reactors are designed to have a major mid-life refurbishment after 25 to 30 years of operation. This refurbishment involves removal and replacement of major reactor components, including, for each Darlington unit specifically, 480 pressure tubes and calandria tubes and 960 feeder tubes. Planning for the project has been under way since 2006, when the Minister of Energy directed OPG to begin assessing the feasibility of refurbishing the units. In January 2016, following years of extensive planning and engineering, the government confirmed its approval for OPG to proceed with the refurbishment of the first reactor. As part of the preparations for the refurbishment, OPG built a life-size mock reactor to train staff on the removal and replacement of the feeder tubes, pressure tubes and calandria tubes. The mock reactor at the Darlington Energy Complex has provided a modern training facility that ensures staff are fully trained and proficient before working on the actual reactors.

In addition to the component replacement work, the Darlington refurbishment also involves preparatory infrastructure and safety improvement work, including, for example, construction of the heavy-water management facility, which will support the future operations of the Ontario nuclear fleet and refurbishment of the remaining Darlington units. The first of the four units to undergo its midlife refurbishment, unit 2, was taken out of service in October 2016. The work on unit 2 is over 80% complete, and the reactor is now being reassembled. The project is tracking on schedule and on budget, and return to service of unit 2 is expected in early 2020.

The overall nuclear refurbishment schedule is set out in the 2017 long-term energy plan, issued by the Ontario Ministry of Energy in October 2017. The refurbishment outages for the final three Darlington units will take place between the beginning of 2020 and the first quarter of 2026. OPG has received approval from our board of directors and the government to proceed with refurbishment of the next Darlington unit, unit 3. Long-lead materials have been purchased, and engineering is over 75% complete.

In December 2017, after a rigorous review of the project costs, the Ontario Energy Board stated that experts agreed that the planning for the project has been conducted according to industry standards. The OEB concluded that OPG had developed reasonable project control systems to manage the cost and schedule of the project. OPG also performed adequate risk assessments of the project and put in place processes to address risks as they arise, which is consistent with the Auditor General's findings.

In its approval of OPG's nuclear payments for the 2017-21 period, the OEB approved the addition of \$4.8 billion to the nuclear rate base to be recovered from customers reflecting the investment in unit 2 and the investment in the preparatory work for the full station refurbishment.

OPG is also very encouraged by the following overall conclusions of the Auditor General:

"While OPG faced significant challenges and experienced cost overruns and delays in project work that was started prior to January 2016, it has applied lessons learned from that work to the remaining project work and in the development of its costs and time estimates. OPG subsequently established time and cost estimates for the project based on reliable information and reasonable assumptions. A fair and transparent procurement process was followed in the selection of the majority of contractors for the project. A clear accountability structure is in place to ensure that staff and contractors working on the project deliver services in adherence to contract terms and legislated safety and environmental 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."

The Auditor General did, however, note that, "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. Therefore, OPG must remain diligent until the completion of the project to properly avoid or mitigate risks."

OPG is taking this very seriously. A principal challenge for the success of the Darlington refurbishment project is the overlap with Bruce Power's refurbishment of six of its nuclear units, units 3 to 8. Bruce's refurbishment schedule will run from the beginning of 2020 to mid-2033. The overlap of the two refurbishment projects will put pressure on the demand for skilled workers and project management staff. OPG and Bruce Power are working together to coordinate procurement, training and staffing as much as feasible, and to ensure both projects benefit from each other's learnings.

OPG is actively working with industry, community and government partners on initiatives that address the supply of skilled trades workers. These initiatives include:

- instituting a requirement in the Darlington refurbishment construction contracts for 20% of the trades' workforce to be apprentices;

- establishing the Indigenous Opportunities in Nuclear program, aimed at leveraging Indigenous partnerships to raise awareness of opportunities and improve recruitment and retention of Indigenous peoples on the project;

- partnering with General Motors and Durham College to provide opportunities to General Motors workers affected by the Oshawa plant closure;

- establishing partnerships with high schools, colleges and government to promote awareness of skilled trades opportunities and create pre-apprentice programs; and

- promoting increased hiring of women into the construction trades.

These initiatives not only help to mitigate the shortage and supply of skilled trades, but also provide an opportunity to advance skills for groups that are underrepresented in the skilled trades.

When it comes to worker safety, OPG applies the same high standard of safety to the construction trades executing Darlington refurbishment work as it applies to its own workforce. This has resulted in a safety incident rate for the project that is almost 10 times better than the overall Ontario construction industry average, and the project has safely executed more than 14 million hours without a lost-time injury.

OPG's planning, preparation and oversight for the project have been subject to much public and independent expert scrutiny. This oversight includes separate independent project overseers reporting to each of the OPG board of directors and the Ministry of Energy.

The Auditor General's report contained seven recommendations, consisting of 18 actions to address the audit findings. We've provided the committee with a document that summarizes how OPG is addressing each of the recommendations in the report. I'd be happy to respond to any questions you have on this.

#### 1250

With a large portion of the work on the first unit already completed, OPG remains committed to continuous improvement and to pursuing all opportunities to mitigate

risks, including those recommended by the Auditor General, to ensure that the project is delivered on time, on budget, safely and to the highest quality.

I'd like to conclude my remarks with a brief update on the current status of work on unit 2 and the planning on unit 3. Overall, the Darlington refurbishment program spending to year-end 2018 was \$5.6 billion—about \$115 million below plan. Unit 2 is forecast to be completed within the committed budget and schedule.

The reactor work has progressed through the installation of new fuel channels, which has just been completed, and installation of the new feeder pipes is nearing completion. This will then be followed by loading fuel, removing all construction equipment and modifications, reconnecting unit 2 to the operating plant, starting the unit up and then conducting a series of tests to confirm that everything functions as designed.

In regard to unit 3 planning, in March 2019 the OPG board of directors approved a \$2.487-billion budget for the unit 3 refurbishment. The public commitment schedule for the unit 3 refurbishment remains at 40 months and continues to be refined with lessons learned from unit 2. Planning is progressing well and is on track for a readiness-to-start-execution milestone of October 2019, and execution is expected to commence in early 2020.

I'll now turn it back over to Ken.

**Mr. Ken Hartwick:** Just to conclude, OPG values the efforts and feedback of the Auditor General of Ontario and is pleased that the Darlington refurbishment project was highlighted in the "Some Good News" section of the 2018 annual report. The AG's report notes that OPG is diligently monitoring the project and has put a clear accountability structure in place to ensure it remains on track.

That concludes our prepared remarks. We will be happy to respond to any questions the committee may have on the refurbishment project or the Auditor General's report.

**The Chair (Ms. Catherine Fife):** Thank you very much, Mr. Hartwick. We'll move over to the government side. MPP Miller?

**Mr. Norman Miller:** Thank you for your presentation. I'm going to start with a question. The member from Haldimand–Norfolk, Toby Barrett, was here this morning. He's not here this afternoon, so I'm asking a question on his behalf from this morning.

I think the auditor seemed to have a fair amount of confidence that things were going to be coming in on budget. But I guess the red flag in the report, also, is on the prerequisite projects that were being done. They were 75% higher than they were predicted to be; \$800 million of contingency has been used up already so there's just \$1.2 billion left. If you could tell us about the oversight mechanisms that are in place for nuclear refurbishment projects and, I guess, give us some confidence—because the history is such that nuclear projects tend not to be on budget—that this project will be on time and on budget.

**Mr. Dietmar Reiner:** We recognize that there were some difficulties with the infrastructure-related projects that had to get executed in preparation for refurbishment. We have taken advantage of opportunities to learn from

that experience and to revise, essentially, our entire project management structure, which includes the oversight for the project.

That has been incorporated into the development of the \$12.8-billion estimate that we've put together for the refurbishment project. We expect all of the increased costs associated with the Darlington refurbishment to be included in that \$12.8 billion and have done a lot of risk modelling and contingency modelling to ensure we've got sufficient contingencies to cover that.

In terms of the oversight itself: I'll maybe start at the bottom and work my way up. We have got a project organization in place in OPG. OPG is essentially the project manager, and we have a variety of contractors in place to execute specific scopes of work. OPG project management oversees that work and ensures that it conforms with contractual terms, as well as quality standards and other regulatory standards—safety standards, first and foremost—that we want to adhere to. Any sorts of issues or actions that arise at that level get dealt with in that sort of day-to-day project management effort.

If you go up a level in the organization, underneath me I have an independent assurance group that also does oversight of programs that are used to execute the project, again, to identify any trends that might be arising in underlying issues and to look at the types of corrective actions that we might want to put in place. This then rolls up to a regular report that's provided to our executive leadership team. Essentially, we provide a verbal report on a weekly basis. The executive leadership team internally meets on a quarterly basis to do a project review just prior to our board updates.

At the board level, we have a committee that is dedicated to overseeing the Darlington refurbishment—a sub-committee at the board that is part of the OPG board. Their sole function is to oversee the project. We report quarterly in face-to-face sessions to the committee and do anywhere between four to eight additional calls in between quarterly meetings to provide status updates on the project. We then provide quarterly briefings to the Ministry of Energy on the status of the project.

We've also got independent oversight that's injected into that. I highlighted the external advisers that both the ministry and our Darlington refurbishment committee of the board have retained to provide an independent validation that the reporting that is provided is reflective of the status of the project and reflective of the risks that the project is experiencing.

We have, aside from that, what we call a refurbishment construction review board. It's a collection of experts from around the world who have experience executing mega-projects. They come together about three times a year on-site and do a dive into specific areas of the project, depending on what the project status is, and provide a report back to OPG on any sorts of risks on the horizon that might be a blind spot for us. It's to raise awareness to help us assess whether the corrective actions taken are taking hold.

Then we also have a series of industry groups that are part of the nuclear operations arena that come in and do

assessments—a nuclear oversight organization that does independent assessments. And we have an internal audit that does independent assessment.

It's quite a robust oversight structure that monitors and tracks the risks and performance against the budget and schedule and safety targets that we've established.

**Mr. Norman Miller:** It seems that the auditor came away with a positive impression that despite that 75% on the prerequisite projects being over budget, you were working to learn from that. That's encouraging.

Did OPG make any changes to the estimate for contingency requirements after the report of the Auditor General in December 2018?

**Mr. Dietmar Reiner:** We have not made changes to contingency amounts after the audit report. We have noted and are thankful for the insights around risk management and the need to pay attention to risks, to do the assessments and to do the training. The contingency amounts still very much line up with what the Auditor General identified in the report.

As we are preparing future unit estimates, where contingency amounts will begin to change—and they are starting to change for unit 3—when we put the initial \$12.8-billion estimate together, we had a schedule that we developed based on scope of work; had a series of risks that we identified associated with execution of that work; ran Monte Carlo simulations to bound that risk; and incorporated some industry best practices around class of estimate and the kind of contingency you would carry for that class of estimate.

That's one of the learnings that came out of those prerequisite projects: that we now, appropriately, account for a class of estimate or a quality of an estimate based on where a project is at. As we move into unit 3—unit 3 is essentially a second-time execution of the bulk of the scope. So what you'd expect to see, and what we are seeing in the estimate, is that much of what was held at contingency before now makes its way into a base estimate because you know essentially what the outcome of the work is going to be based on having executed most of the time. So the base estimate grows and the contingency estimate starts to decline, but everything is still within that envelope.

1300

**Mr. Norman Miller:** The mock-up reactor that you created: Has that been a helpful change to the way you're doing this?

**Mr. Dietmar Reiner:** That mock-up reactor, I would tell you, was one of the best investments we made in planning and preparing for the project. We've done two things with the mock-up reactor. The critical path on the project, which project management speaks for, is the work that essentially establishes the timeline of executing the project. That runs through the reactor component replacement. Having that mock-up gave us the opportunity to test all of the tooling that gets used to execute that work, get staff familiar with utilizing that tooling, allowed us to do time trials, to actually build a schedule that's reflective of the kind of performance that we'd expect to see in the field.

We also mocked up not just the reactor itself but also what we call a reactor vault the structure that contains the reactor in the Darlington station—all of the interferences that you might encounter.

A big part of this job is logistics. It's getting heavy equipment and flasks in and out of the reactor building through one doorway, getting new components in, old components out, and people moving in and out. So just rehearsing the logistics that you have to go through has paid dividends in terms of avoided time in figuring those things out. Understanding what kinds of interferences you run into when you have to build the tooling platforms inside the real unit: That has paid dividends.

We still see huge opportunity to get more benefit out of that mock-up. Based on what we've learned on unit 2, you always end up with field conditions that are slightly different than what you have mocked up. We're now able to take the unit 2 experience, apply it to the mock-up and do more tabletop real-life training scenarios. We're building that into the training and readiness plans for future units.

**Mr. Norman Miller:** Thank you. Another area of the report was to do with having enough skilled people: boilermakers and a number of other trades. In the follow-up, the status update that you provided, it said that OPG would develop supply-and-demand models for trades, insulators, millwrights, carpenters, electricians and pipefitters. Preliminary assessments have been completed.

What are the results of these preliminary assessments for each trade category? Have you identified the staffing shortage, or what gaps have you identified and how are you planning on addressing that? I think you answered part of it in talking about apprenticeships and some of the other things.

**Mr. Dietmar Reiner:** In collaboration with Bruce Power, we've looked at the schedules as they're currently laid out and the demands of skilled trades and have looked at what the impact of the overlaps is and what that profile looks like across time. We've done that for each trade. There are a couple of trades that become the constraining trades. Primarily, boilermakers: That's the most constrained trade. Boilermakers are the folks who work on pressurized systems, and the reactor is essentially a pressurized system.

We've done a fairly comprehensive assessment of demand, and we've layered into that our experience on unit 2 and the trades' draw on unit 2 in actual execution and have updated that demand profile. We're working with BuildForce Canada, have provided them that demand. They've taken that demand and included all other Ontario infrastructure work and other large projects that are under way in the industry. They also work with the trade unions to see what the supply equation looks like. And there are shortfalls.

The options that we are pursuing: One is most definitely outreach and awareness. The awareness includes outreach to schools and to the colleges to look at what can be done to train people in things like pre-apprentice programs to get them ready for an apprenticeship. We've done outreach at the high school level. We had a group of high

school teachers from the Clarington-Peterborough-Northumberland Catholic school board out at our Darlington information centre just a week ago to have a look first-hand at what the jobs are like, to educate themselves on what sorts of opportunities—so that they can bring that information back to the younger kids who are making career choices.

**Mr. Norman Miller:** How long does it take to become a boilermaker?

**Mr. Dietmar Reiner:** It takes four years to work your way through an apprenticeship and become a journey-person boilermaker. But the key is that you need that influx of people, right? You need the kids in high schools to understand what the career options are so that they start picking a different path than just a university path.

**Mr. Norman Miller:** What does a boilermaker get paid?

**Mr. Dietmar Reiner:** They make very good money. They can make a very good living. I can get that information, what a journey-person makes—

**Mr. Norman Miller:** I just assumed that it was probably pretty good pay.

**Mr. Dietmar Reiner:** It's very good pay. The eye-opener that I would just share with the committee here, for folks who come in to have a look—this is not dirty work. They're operating robotic tools. There are people on joysticks, operating remote tooling. It's a very clean environment.

It's a 10-year project. The timeline allows them to put down roots, to settle in the communities. So it's an attractive career opportunity. I think what we need to do is increase the awareness, work with partners in government, in the schools, in the communities, to get programs in place and get funding in place for things like these pre-apprenticeship programs, and to tap into non-traditional sources.

**Mr. Norman Miller:** In your follow-up response to the auditor, you said you were collaborating with federal and provincial stakeholders to facilitate peak demand resourcing using international boilermakers. How many international boilermakers have been hired by OPG, and which countries do they come from?

**Mr. Dietmar Reiner:** We have not yet tapped into that source. Right now, the trades' demands have been fulfilled by travellers from outside of the local halls and outside of Ontario. We do have travellers who come in from as far away as the east coast and as far away as the west coast. We've got the entire country, essentially. We have not yet tapped into that—

**Mr. Norman Miller:** Do you have some idea of market of international—are there any available out there?

**Mr. Dietmar Reiner:** There are. In Ireland specifically, we were invited to meet with some of the trade unions through our Ontario-based trade unions, with the Irish boilermakers and millwrights. They have a surplus. They have a surplus that is ready to deploy, and they're looking for jobs. That is a near-term source that could alleviate a part of this problem.

**Mr. Norman Miller:** Thank you. I'll pass it on to one of my colleagues.

**The Chair (Ms. Catherine Fife):** MPP McDonell.

**Mr. Jim McDonell:** You mentioned pay grades and some descriptions of the jobs. It would be helpful to have that, because in our own ridings that are somewhat remote from Toronto, I think the opportunities are there, if we can help maybe get the word out. I know a couple—

**The Chair (Ms. Catherine Fife):** Mr. McDonell, do you mind coming closer to your microphone and speaking up a little bit?

**Mr. Jim McDonell:** Yes. I know I've had the opportunity to tour Bruce, Pickering and Darlington over the years, and that was something that they were identifying. So I'm trying to make them aware at home, but I think it's hard to resonate unless you have some data on salaries and actually what the jobs are. I think your talk about the robotics will scare some people off, but it will entice other people, because it should be a great opportunity going forward.

**Mr. Dietmar Reiner:** We'll take that action. We have already put together a set of brochures that provide that education on: What is a boilermaker; what is a millwright; what sort of work do they do?

One of the things we learned in starting to solve this problem: There isn't a huge awareness on how to become a tradesperson out there in general. It's a gap—even people who are interested, right? We run into kids, young people, who are interested, and the first thing they ask us is, "Can you help me? I don't even know where to apply."

1310

We've put together brochures and pamphlets; we make the connections with the trade unions, the union leadership, in partnership; and we run an open house annually at the Darlington Energy Complex. We invite the union leadership to those open houses—the construction contractors—so that they can talk about the jobs. But we'll take that action to also let people know what sort of living they can make in a job like this.

**Mr. Jim McDonell:** Your demand is great. We have access to most of the—well, all of the high schools, really, in the province. Jobs are certainly a priority of the schools, and we try to move more and more people into the trades.

I know that there might be tours, and I actually worked a summer job back in Bruce. But the units are very similar at Darlington. Are they almost identical, or were there changes as it went on?

**Mr. Dietmar Reiner:** The units are, for all intents and purposes, as far as refurbishment goes, identical. There are some variations—

**The Chair (Ms. Catherine Fife):** One minute left in this question set.

**Mr. Dietmar Reiner:** There are some variations in the scope of work. We are doing a turbine generator control system upgrade on unit 3 and on future units. We did not do that on unit 2. We're going to come back to do that on unit 2 in the future. That was primarily a risk-mitigation decision on our part, to first focus on reactor reconstruction and get that done the first time and then do a first-time

turbine control system upgrade on the second unit. But other than that, the scopes of work are identical.

**Mr. Jim McDonell:** Is that an extensive upgrade timeline?

**Mr. Dietmar Reiner:** The reactor work still becomes critical path. It is an extensive upgrade. It takes old technology and replaces it with digital control. There's always the potential of added time, which is why the schedule duration for the second unit and first unit remain the same. The potential added time is in the run-up at the back.

**The Chair (Ms. Catherine Fife):** Thank you, Mr. Reiner.

I'll come back to you after this question set, MPP Parsa. We're beginning now with MPP Tabuns.

**Mr. Peter Tabuns:** Gentlemen, good afternoon. Thank you for being here. I have a few questions, and I think my colleague will have some as well.

Before we go into further detail—and I guess it would be you, Mr. Hartwick: Of the radioactive waste from this project—as you're refurbishing those calandrias, you'll have these fuelling tubes. Where are they stored now and where will they be stored in the long run?

**Mr. Ken Hartwick:** I'll actually turn it to Dietmar, who runs that part of the refurb process as well.

**Mr. Dietmar Reiner:** All of the reactor components that get removed from the units during refurbishment get processed. The processing includes separation of more highly radioactive components from lower-radioactive components. They are then put into containers. The low-radioactive components get shipped immediately to the Bruce site for storage. The higher radioactive components—there's a volume reduction process that occurs, which essentially takes the tubes, compresses them and cuts them into smaller pieces. That gets put into waste containers. The containers are very much like—you may have seen the used fuel storage containers, these white, oval, tall, cylindrical kinds of containers. They sit in a storage building that we've constructed at the Darlington site. It will remain there until those containers are ready to ship to a deep geological repository.

**Mr. Peter Tabuns:** What are the costs of the storage of this waste?

**Mr. Dietmar Reiner:** The storage at Darlington of that waste is included in the \$12.8 billion. There is an ongoing cost to supply maintenance and power to that building which is not part of the \$12.8 billion; that would be included in Darlington's operating budget.

**Mr. Peter Tabuns:** I appreciate that the costs are separated out between two different budgets. What are the costs?

**Mr. Dietmar Reiner:** The cost of the storage building itself, I believe, was around a \$40-million investment. The containers—I'd have to get you the answer on what the containers cost. The cost to actually maintain that building is—again, we'd have to get you that answer, but it's a very low number because there's no heating in that building; it's essentially lighting when somebody enters the building.

**Mr. Peter Tabuns:** Okay. If you'd commit to providing those numbers to this committee before we get into our report writing, I would appreciate that.

The next question I have—actually, it's a side issue, and then I'll get into the heart of it. I understand there is consideration of moving some of the staff from Pickering power plant to Darlington to assist with the refurbishment. Is that correct?

**Mr. Dietmar Reiner:** As part of the return to service of unit 2, at that point in time, the construction work is essentially complete, where you're bringing systems back online and you're now doing that final testing and checking that all systems work correctly. That's a very operationally intensive exercise. An option that's available to us, and we'll utilize it if we need to, is to tap into qualified operators that we have at the Pickering plant that could be utilized if we have a shortage in operations staff, to help us with bringing the unit back online.

**Mr. Peter Tabuns:** Okay. I know that part of Pickering will be shut down before the whole thing is going to be shut down. So what are the shutdown dates for partial, and what are the shutdown dates for the whole operation there?

**Mr. Ken Hartwick:** I think our licence with the CNSC goes out to 2028 for the station. It's anticipated that the units can operate up to 2024, and then you have a period of safe store. We're just in the process now of laying out the specific schedule for each of those six units. If you recall, two are already in a laid-up stage. We're working through now, with the CNSC and their process, as to the sequencing of the six units as we move through that phase. But the 10-year licence we got last year goes through the safe-store period out to 2028.

**Mr. Peter Tabuns:** But the actual operational period ends in 2024. Is that correct?

**Mr. Ken Hartwick:** Our commitment to go back to the CNSC is to go back with specific dates for each of the six units leading up through 2024.

**Mr. Peter Tabuns:** Okay. Thank you.

On page 124, the auditor talks about safety gaps that have to be addressed with this refurbishment and the reason for an emergency power generator set at a higher standard than previous power generators. What level of earthquake is this new generator supposed to be able to withstand, and what level of earthquake do the existing generators have resistance to?

**Mr. Dietmar Reiner:** That is a highly technical question. I'm going to do my best to answer it in generalities and, if required, we can probably make available some seismic data, but—

**Mr. Peter Tabuns:** That would be great. Please, go ahead.

**Mr. Dietmar Reiner:** That level of seismicity that needs to be withstood is a Canadian Nuclear Safety Commission requirement. They establish a seismic curve, essentially, which goes through a set of frequencies and tells you where on that curve your structures need to be based on the type of structure that it is, if it's a safety-related

system or if it's a non-essential system. That is all translated into specific codes that engineers can then utilize to do design work.

When we undertook the Darlington refurbishment, one of the things that we needed to do—the station was initially constructed back in the 1990s under a set of requirements that were developed at the time. Obviously, through time, those have changed. The station does upgrade systems and ensure that they are always compliant with regulatory requirements; there is never a non-compliance. But in the case of refurbishment, where you're looking at 30 to 35 more years of operation, the regulatory framework requires you to go through—and we've gone through this—an exercise where you essentially look at, "What would I have to do if I was constructing a brand-new nuclear plant today? What would I need to have in that in order to meet those requirements for the next 35 years?" We conducted that analysis.

There are cases, for example, where you can't start over. You've got structures that are built already, so you look at, "How do I enhance those?" One of those, for example, is a third emergency power generator. By constructing that third emergency power generator to that new standard, it meets that requirement to allow the plant to operate for another 30 years under the current seismic requirements set out by the Canadian Nuclear Safety Commission.

**1320**

Another example would be the containment filter venting system. That is a system that allows radioactive steam to be vented from our vacuum building in the event you had some sort of—call it an earthquake or whatever kind of event that resulted in a multi-unit steam leak. That's another enhancement that came out of that review process; we built that venting system that allows for a release of steam without releasing radionuclides with it.

So you go through an exercise like that, and that essentially determines what sorts of safety improvements you need to make to the plant in order to allow it to operate for that next 30 to 35 years.

On an ongoing basis after that, there's a licensing program that the station will go through on periodic cycles, and those kinds of safety reviews get redone, and if there are changes to codes and standards, the station would have to be upgraded to meet those.

**Mr. Peter Tabuns:** Okay. I appreciate that answer. Again, I'd like you to commit to providing us with the information as to what standard of seismic activity the existing emergency generators would be adequate for a response to, and the new standard of seismic activity that these generators will be responding to. That would be very helpful.

**Mr. Dietmar Reiner:** Okay.

**Mr. Peter Tabuns:** Just out of curiosity, does the Pickering station have the emergency generator set up to deal with a seismic event at the same level as Darlington will have when this is done?

**Mr. Dietmar Reiner:** Pickering also has standby generators and emergency power generators. They are designed and meet all of the licensing requirements of

Pickering, which would include any of those kinds of seismic requirements. In the case of Pickering, that's covered under a current operating licence. We're not looking to refurbish and run that station for another 30 to 35 years.

**Mr. Peter Tabuns:** So the seismic impact or the level of seismic event is one that would have been set the last time Pickering was refurbished; it doesn't reflect the current science. Is that correct?

**Mr. Dietmar Reiner:** The actual design-basis earthquake that was used at the time the plant was designed might have been different, but there are compensatory things that get introduced to account for that.

**Mr. Peter Tabuns:** Like what?

**Mr. Dietmar Reiner:** For example, you may have heard of the emergency management equipment that we now store close to our sites: things like, for example, diesel-powered pumps and diesel-powered generators that can be brought in in the event that you have a power failure as a result of some sort of an event, right? There are additional layers of defences that regulation requires you to incorporate, recognizing that things may not have been designed to the kind of standard you would design it at today. That's how you keep everything at a safety standard that's consistent across Darlington and Pickering and that meets the Canadian regulatory requirements.

**Mr. Peter Tabuns:** Okay. Thank you for that.

The January 2016 announcement about the cost of the project, \$12.8 billion to complete—that was 2016 dollars? Is that correct?

**Mr. Dietmar Reiner:** The \$12.8 billion is all-in.

**Mr. Peter Tabuns:** Sorry, is it—because you'd had earlier estimates in 2010 dollars.

**Mr. Dietmar Reiner:** Yes.

**Mr. Peter Tabuns:** So is this in 2016 dollars or 2010 dollars?

**Mr. Dietmar Reiner:** That estimate includes inflation. The \$12.8 billion—are you—

**Mr. Peter Tabuns:** Yes, \$12.8 billion was what was announced in January 2016.

**Mr. Dietmar Reiner:** Yes, those are as-spent dollars. When you tally up every dollar that we spend on this project from now until completion, \$12.8 billion is the budget we stay within. There is no additional inflation factor that gets added onto that.

**Mr. Peter Tabuns:** Okay. Thank you.

On page 128, the auditor notes, "Project work is primarily performed by external contractors. OPG selects the majority of the contractors by following a competitive procurement process." Out of curiosity, why weren't all of the contractors selected with a competitive procurement process? Who was selected without a competitive procurement process?

**Mr. Dietmar Reiner:** Every contractor that was selected for the Darlington refurbishment program was selected through a competitive procurement process. In some cases, that procurement was not part of the Darlington refurbishment program. We have contractors that supply materials, for example, to the plant that, as part of

our normal course of business, we would run a competitive procurement process for, and we purchase parts under those contracts. But everything that we have contracted for the Darlington refurbishment program underwent a competitive procurement process.

**Mr. Peter Tabuns:** If I could ask the auditor: When you noted, Auditor, that it was a majority of the contractors, is your understanding any different from what we've just been told? That's page 128.

**Ms. Bonnie Lysyk:** Yes, I'm just looking. You know what—

**Mr. Dietmar Reiner:** I'll try an example, and Ms. Lysyk, this may be an example that comes to mind. The turbine generator control system upgrade that we are executing—that system is a General Electric system. General Electric has the intellectual property rights for that system. That was a sole-source agreement that we executed for procurement of the parts and the technical services, because it's like you drive a Ford and you go to General Motors to buy a Ford engine; well, you can't do that, right?

**Mr. Peter Tabuns:** Right.

**Mr. Dietmar Reiner:** That would, I think, probably be the example of where a sole-source arrangement was put in place, but in terms of the construction work itself, that was done under a competitive procurement process.

**The Chair (Ms. Catherine Fife):** Thanks. We're just going to hear from the auditor.

**Mr. Peter Tabuns:** Auditor General?

**Ms. Bonnie Lysyk:** Yes, I think part of it is, there is a narrowing down of the process, so you have to look at the skill sets out there and the qualifications. I think our reference in that word was that OPG, in some cases, looked to see who was qualified and then, out of that group, selected the ones that were most qualified and then offered them the opportunity to bid. Hence, the words "in most cases."

**Mr. Peter Tabuns:** Or a majority.

**Ms. Bonnie Lysyk:** Majority, yes.

**Mr. Peter Tabuns:** Right. Okay. Thank you.

I want to go to the deputy minister. One of the things that was striking to me, given that we'll be looking at the Fair Hydro Plan next week—I won't ask you about the Fair Hydro Plan in any depth right now—is on page 130 of the Auditor General's report, where she shows a graph with the cost of power from Darlington from now until 2036. I note that in 2020 the cost of power from Darlington will be 8.5 cents; the year after, nine cents; the year after, 10.3 cents; and then there's two years of 12.7 cents and then we get up to 17.2 cents a kilowatt hour, and then over an extended period the price comes down.

We're borrowing \$2 billion or \$2.5 billion a year right now to keep hydro prices low. Have you factored in these increasing prices to that cost of borrowing money to maintain lower hydro prices?

**Mr. Stephen Rhodes:** It's hard to answer that one so directly. I believe we have. What we're working with with OPG right now, as was mentioned earlier, is that they have an OEB approval for their rates from 2017 to 2021, I believe.

**Mr. Ken Hartwick:** Yes.

**Mr. Stephen Rhodes:** They will have another rate application that they need to do prospectively, but based on the rates that we know now, that has been factored in.

**Mr. Peter Tabuns:** Are you expecting, then, that we'll be borrowing a lot more money on the market to keep rates low? Because this is a very substantial plant. When its power costs go up to 17.2 cents a kilowatt hour, there's an "ouch" factor there.

**Mr. Stephen Rhodes:** Sure. I would say—and I'm sure OPG will have more to offer, but we have an application we have to do to the OEB between 2022 and 2026. The OEB has the ability to do rate smoothing over a period of time. These refurbishments are over a 30-year time frame. The average cost over that 30-year time frame is still extremely competitive. So we'll be working through that process with OPG and within the ministry to do everything we can to keep it as appropriate as possible and respectful for ratepayers.

1330

**Mr. Peter Tabuns:** Is it fair to say that, at the moment, you don't know how much more it's going to cost us?

**Mr. Stephen Rhodes:** I guess that's fair to say. I don't know how much it's going to cost because I can't foresee exactly what the OEB is going to rule.

**Mr. Peter Tabuns:** Just because I haven't gone through some of this in prior years—I understood that what was before us was the result of rate smoothing.

**The Chair (Ms. Catherine Fife):** Last two minutes, just so you know.

**Mr. Peter Tabuns:** Time goes so quickly, Chair; so quickly.

**The Chair (Ms. Catherine Fife):** I know. You're having fun. I can see that.

**Mr. Stephen Rhodes:** You're correct. What's before us is based on rate smoothing. That's what we have between 2017 and 2021. An application is forthcoming. Our friends at OPG are working on that one. It will be within the OEB's discretion to determine whether they apply that or not. What we have now, yes, did deploy that.

**Mr. Ken Hartwick:** If I could add that I think that's right in our last rate filing with the OEB. That rate smoothing was a key element of what we were asked to look at and consider, and what we ultimately did for the 2017-to-2021 period.

To your point, given the magnitude of costs to bring Darlington back to service, we would approach it in a similar manner. I don't want to prejudge where we and/or the OEB will ultimately get to, but again, we look at the average cost over the life of it—being the eight cents—being very competitive.

**Mr. Peter Tabuns:** And if in fact you're able to bring that peak down, does your rate smoothing envision higher rates because we're going to have to cover financing in the years after 2026?

**Mr. Ken Hartwick:** Again, I don't want to prejudge ultimately what we take to the OEB for our 2022 set of rates. But I think any time you have a regulatory or variance account or other items that are used to smooth,

there's always a cash flow and then a financing element to it. That will be all of what we factor into what we'll ultimately propose to the OEB and the OEB will ultimately opine on for our rates.

**Mr. Peter Tabuns:** But what's shown here is what you're expecting at this point?

**Mr. Ken Hartwick:** What's showing here is an illustration of what the cost is relative to the generation that is produced by the units. It's not a reflection of what we are proposing to take to the OEB. We have just not got to that point.

**The Chair (Ms. Catherine Fife):** Thank you very much.

Moving over—MPP McDonell, and then MPPs Parsa and Surma.

**Mr. Jim McDonell:** Just back to the ministry: I'm looking at page 131. You have your demand forecast for up to 2035. Very little increase in demand, I guess, is what we're showing in that time frame. That would be under 4% or 5% probably. Would that still be looking as if that's where it is today?

**Mr. Stephen Rhodes:** That supply-and-demand curve is fairly accurate, although I would say that the Independent Electricity System Operator puts out updates on a fairly regular basis and is constantly monitoring out there which facilities are open, which are functional, which are available, what the contracts are and that sort of stuff. But that's reflective.

**Mr. Jim McDonell:** Yes, I know. I'm just thinking, as we move ahead—and there's a lot of pressure, of course, on the environment—wouldn't we see a greater demand for electricity going forward as we talk about more electric charging, a lot more getting off of older systems that we use in our homes for heat, for instance? It's almost a flat supply requirement going forward, which would be somewhat surprising.

**Mr. Stephen Rhodes:** That's the current forecast, right, for sure.

**Mr. Jim McDonell:** Okay. Maybe back over to the OPG: As I said before, the units in Darlington are very similar. How similar are they to Bruce in design? It was built a few years before, but it's basically the same templates, the same design.

**Mr. Dietmar Reiner:** Essentially, they're both Candu technology, a lot of commonality—

**Mr. Jim McDonell:** But they were built as units first. I think Pickering was a little more ad hoc and they were quite different.

**Mr. Dietmar Reiner:** Yes, slightly smaller in terms of megawatt output—the Bruce units. The structures inside the plant are a little different, because seismic standards changed over time and construction standards reflect that.

But in terms of the components that get utilized for the reactor refurbishment work, they're identical. The pressure tubes, the calandria tubes, the feeder pipes: They're the same.

**Mr. Jim McDonell:** Is there a lot of co-operation between the two organizations, Bruce and Darlington, as far as the operations—the training goes? You've built that

mock-up. Is Bruce utilizing that? Their first unit that they turned out didn't have the benefit of the mock-up, and I know there were some lessons learned on the two units they did there.

**Mr. Dietmar Reiner:** There's an awful lot of collaboration between us. On the mock-up specifically, Bruce Power is building a mock-up. I don't believe it's going to be a full-scale mock-up like ours. The opportunity to utilize that to train all staff would be difficult because that mock-up gets used essentially around the clock for that entire refurbishment period. So they do have a need to have their own mock-up; they are constructing one.

Areas where that collaboration really shows benefit—and ultimately, it'll be a benefit to the ratepayer at the end of the day. There is a process that we had to go through to requalify the supply chain in Ontario to fabricate nuclear-grade components. That's pressure tubes, calandria tubes and fittings, and all of the associated hardware, and that process is quite comprehensive.

There's a design specification that gets developed. We developed that for Darlington. That's available to Bruce to utilize. We've made that available. We then take the fabricators, and we have them build—essentially we call them preproduction components. We then do a bunch of testing on those components to ensure that they meet the rigours of that nuclear environment. If there's anything that needs to be adjusted in the fabrication, they'll make those adjustments.

It's quite a lengthy process. It took us many, many months to do this for feeder pipes, but once that is done, that essentially allows the manufacturers, the supply chain, to put their quality programs in place, and all of the procedures associated with making those components, and essentially reproduce them.

An area where the collaboration has really helped is that Bruce Power is able to just place orders and not have to go through that same process. That's where we're looking for opportunities that ultimately make their way back into the benefit to the ratepayers.

**Mr. Ken Hartwick:** If I could just add to it: Organizationally, at the most senior levels, we're in constant contact with each other. We just think that the success of both refurbishments is what's important. Bruce has been very active in sharing findings and developments that they have as they head towards this next refurbishment that they're going to begin early in 2020.

I just think the level of interaction organizationally has been exactly what I think ratepayers would want—that level of collaboration—so each of us can share and learn from what the other one knows.

**Mr. Jim McDonell:** I know, from visiting the mock-up, that it's quite a building. Is there a plan for that going forward after, I guess, 2026 or whatever the time frame is?

**Mr. Dietmar Reiner:** We've had lots of interested parties come up with ideas. One example would be that there are Candu reactors in Romania. Those reactors are going to undergo a refurbishment. It's about 10 years out, that refurbishment. We've had a group of folks from Romania come several times already to have a look at the facility, so it's something that we could make use of.

We would also utilize it internally as a maintenance facility. We've got a fairly comprehensive mock-up-type maintenance facility at Pickering for the Pickering plant. We would utilize this in the same way for the Darlington plant for any future maintenance that would be needed to the unit. But there are certainly opportunities, and we will explore those when the time comes.

**Mr. Jim McDonell:** Your plan with Bruce and yourselves is fairly coordinated as far as making sure we have enough power going forward. The state of the demand curve seems flat, but there are some things that could change that, of course. The Ring of Fire is one thing, and I know that I've heard concerns there about lack of power if that actually does take off. These projects tend to be a little elongated and don't happen as quick as they—is there a contingency plan? If we don't go and get them done as quickly, that would certainly point to a shortage of power, and power generation takes a while to put in place. Is there enough of a factor of safety? Because that's a bit of a concern.

1340

**Mr. Ken Hartwick:** I think it's part of the overall planning process that the IESO goes through, where they look at both our refurbishment schedule and the Bruce refurbishment schedule, normal outages that we have across the system, whether it's on hydroelectric stations and/or the normal outages you have at a nuclear plant. Then they build in a level of contingency associated with that, for the reasons you raise, so that when they do their ultimate supply-and-demand report, it reflects a level of conservatism built into their assumptions.

So it's really the IESO that looks at that. Then that's a constant dialogue between ourselves, Bruce Power, other generators across the province and the transmission side as well, just to ensure that to the extent that there is a gap developing, then there are steps taken to address it. But we have a lot of coordination between the collective group and the IESO.

**Mr. Jim McDonell:** I asked that question because, you know, you look at this curve and it's certainly surprising. The population of the GTA has gone up by half a million people in the last five years and is projected to keep on that track. As we move to technology, most of it is moving towards electricity. That is the great hope.

I'm a little surprised when you look at that and the end result is that there's zero increase in demand, almost. It's just surprising. I know that's not your bailiwick; that's the IESO's. But I just wondered at those numbers and where we're going with that. It's just surprising.

I think Mike has some questions.

**The Chair (Ms. Catherine Fife):** MPP Parsa.

**Mr. Michael Parsa:** Thank you all for coming here. I really appreciate all the information you're providing for us.

My first question is about the losing of the expertise when it comes to the management and the executive. You had numbers that talked about losing 25% and 75% by 2021, and by 2025, losing 30% of management and virtually all of the executives when it comes to the Darlington refurbishment group. What process do you have in

place, when you lose this much expertise and memory—institutional memory is what they refer to. How do you combat that?

**Mr. Dietmar Reiner:** We, like most industries, also have that baby boomer population that's getting to the tail end of their career—and I'm probably in that pool. It is important for us to ensure that we have the capability that continues to sustain the effort, going forward—not just to the end of refurbishment, but for the future of our company. It's critically important to us.

We have quite a comprehensive succession planning process and development planning process. It's one that we use across the company. We do this for all management, and we even do this for our Society of Energy Professionals staff, our professional unionized staff. We put in place career development plans and training plans that make those folks ready for opportunities that may emerge for them.

As we roll that up into management, we're a little more precise about it. We obviously monitor the performance of our staff. We look at capability on an ongoing basis. With that, we then begin to identify what areas and what positions folks would succeed in up the career ladder, so to speak. We run that process quite regularly. We also align it with our interests. Obviously, we need to have folks who are interested in those careers.

In the case of Darlington refurbishment, one of the things that we had to do to enhance that process—this is the first real major mega-project for the company in a long, long time since the initial construction of these facilities. We did not have the kind of sophisticated project management capability that we needed to have, so we built a lot of that. We have now put in place training programs specifically to address that, and career paths with specific jobs and roles, given that we've got these opportunities for quite a period of time.

We've got a project management career path in place for people. They can train. They can take positions at various levels. When they're in management, we'll appoint them to certain positions. We'll broaden them horizontally to make them ready. But it's an ongoing process that we execute to deal with this particular risk.

**Mr. Ken Hartwick:** One of the points, too, that is really important is that when you present both to management and employees a station that's going to have 30 years of life after the refurbishment is done, they're willing then to invest in their careers to develop. Part of the success that the team has had around the succession planning and ensuring that we fill those gaps is now a clear career path for a long period of time, which is really important to people as individuals. That part gives us a lot of confidence that we'll be able to address some of the gaps that are there and build out a team that can operate the station for the next 30 years.

**Mr. Dietmar Reiner:** We do also hire from outside for some of this in some cases. We've got some roles where you don't need to be a nuclear physicist with 20 years of experience at Darlington station. We bring in new graduates from universities, and we do go out and hire professionals externally as well.

**Mr. Michael Parsa:** Given that this is specifically on refurbishment, having some prior experience, for example, at the Pickering plant may be of some help and some relief. But the fact that this is specific to refurbishment, bringing in executives from the outside—would that kind of training be available to them as well?

**Mr. Dietmar Reiner:** So in the case of—

**Mr. Michael Parsa:** Because having management expertise is very different than having the specific knowledge and expertise when it comes to refurbishment of these—

**Mr. Dietmar Reiner:** Yes. We did some very specific things in order to get us ready with the right team for unit 2. Obviously, this gets a little easier in time because you've got the experience of working on unit 2 that you can then apply to unit 3 and so forth, so the process will run itself. Getting started initially did present some challenges.

What we did in cases like that: We actually sent several folks from OPG to Point Lepreau when that plant was being refurbished. The gentleman who actually ran that refurbishment project works for me. He runs the unit 2 execution in the field. So we've got that experience from outside.

We've also brought in people externally from around the world who have had experience in China with some of the construction projects there, and in Korea on the refurbishments there. In the United States, for example, there was nuclear construction activity under way in the US, and we pulled together a collection of experts to help us form the initial team and to ensure we've got that management expertise that can manage large-scale projects.

We've also pulled some of that from other projects. We've pulled people in from the oil industry, for example. That's another source, actually—you know, similar complexity in terms of process and environmental regulation, that sort of thing; complex projects as well. We did a little bit of that as well.

**Mr. Michael Parsa:** Okay. Thank you. My next question is regarding the safety. It was on one of the audit reports and it said that even though there were no serious injuries reported, OPG has not met its safety target and the frequency of safety incidents has essentially remained unchanged since 2016, when the refurbishment started. Why is that, and have things changed since the audit?

**Mr. Dietmar Reiner:** We made a very conscious decision when we established the targets for refurbishment that we would set the safety target to the same standard for the construction trades that we set for our own employees. I gave in my opening remarks the comparator to the construction industry in Ontario. Our performance is tenfold better than the Ontario construction industry, and the target is even tighter than that.

With the construction trades, you deal with essentially, I'll call it, a transient workforce that comes out of the union halls, gets onboarded by us and trained by us, and then put to work. As part of that training, we put a lot of emphasis on safety training. Safety is always first and

foremost. You get a culture with those folks that you've got to undo, and you've got to align that with the culture that you want in the company.

**1350**

I will tell you that by the end of 2018, our safety performance for the construction workforce was essentially at our internal OPG target. Our internal OPG target was 0.37 injuries per 200,000 hours worked, and we achieved 0.38 by the end of 2018. We had exceptional performance.

We welcome the insights from the Auditor General on this, because the important thing is always to have enough precursors, to look at the precursor events and anticipate what might happen, what the trends are telling you with regard to the types of safety events that you might have.

Then we do things like a proactive stand-down of work. Some folks might see that as being a drastic action. It's the right thing to do. If we feel that there is a potential risk of somebody getting harmed because we're not seeing the right behaviours, we'll conduct a stand-down, and we've done that. It gives us an opportunity—

**The Chair (Ms. Catherine Fife):** One minute left.

**Mr. Dietmar Reiner:** It gives us an opportunity to have those conversations with leadership, with foremen, with supervisors, with staff, to reinforce those safety basics.

With regard to the recommendation on looking at corrective actions and the effectiveness of those corrective actions, we've gone back and looked at all of the 2018 safety events and looked at the trends, and there are some areas that have trended down significantly, like falling objects, potential falling objects, potential falls from heights. There are other areas where we've still got work to do, and we're not going to let up on that. That's going to remain our number one focus, and we're going to continue to drive to actually get it to zero. That's where we want it to be.

**Mr. Michael Parsa:** Thank you. Given that I probably only have 20 seconds—

**The Chair (Ms. Catherine Fife):** Yes.

**Mr. Michael Parsa:** Okay. Are there aspects of phases of this refurbishment process that are more dangerous than the others? For example, is disassembling the reactors more dangerous than reassembling them back?

**Mr. Dietmar Reiner:** I'll call it a difference—

**The Chair (Ms. Catherine Fife):** You know what? We're going to come back to that answer. You have some time to think about it.

If you are looking for future employees, though, Mr. Miller is looking to be a boilermaker. We're looking for long-term jobs around here.

Going over to the official opposition: MPP Tabuns.

**Mr. Peter Tabuns:** Returning to the deputy minister, I have concerns about the cost of this power in the long run. Let's say you're able to avoid 17.2 cents and you're at some level above that. When I was talking to OSPE yesterday, when they were coming around, they were telling me that in the southern United States—the Ontario Society of Professional Engineers were telling me that in the United States, solar contracts are being signed for under three cents a kilowatt hour. So we will be competing

with economies that will be able to buy power under three cents a kilowatt hour in bulk, and a big chunk of what we're going to be powering ourselves with will be over 10 cents a kilowatt hour. Are you concerned about grid defection?

I'll just note that we lost Xstrata a few years ago from Timmins. They went across to Quebec because of power they could get at five or six cents a kilowatt hour, not available in Ontario. What are your concerns about the potential for power defection?

**Mr. Stephen Rhodes:** Obviously, the cost of power is an extremely topical issue. When I look at the Darlington refurbishment and I look at the 30-year time frame and trying to do the averages over that time frame, as you pointed out before, there are some spikes and unknowns that are obviously something that we're all keeping a very keen eye on. But when I look at the 30 years, the current estimate in 2015 dollars is that the refurbishment, if it continues to go on target, on budget, is seven to eight cents; and the type of power, the baseload that it's providing, is very different than some of the other options that are available.

I look at the report from the Financial Accountability Officer, who had a look at refurbishment back in 2017. At that particular time—although things are changing, as you point out; they change very quickly—at that particular time, and I think it's still true today, there's no alternative low GHG-emission generation platform that's going to be as competitive as nuclear. So at this particular point in time, I think it's the right way to go. Obviously, keep on top of everything, monitor things carefully, but I do think the base that nuclear provides in terms of being a baseload generation piece, across-the-board available 24/7, is the right way to go.

**Mr. Peter Tabuns:** The other question that I have—and thank you for that—is that figure 9 on page 131 shows net summer peak and annual average electricity demand from now to 2035. You see a slight increase in demand when you get past 2025. I know that the head of Quebec hydro has talked about the threat to demand in Quebec from solar installation in Quebec. New England power systems have been talking about the threat to demand from the growth of individual solar.

The projections that we have before us: What study are these numbers based on?

**Mr. Stephen Rhodes:** I haven't read the full footnote piece here—I have to get my glasses improved. I believe the data source is IESO. I believe a lot of the data that is in this chart is from the long-term energy plan, primarily, with some modifications that are footnoted.

**Mr. Peter Tabuns:** I see the footnote. Would it be possible for you to provide us with the IESO calculations for that forecast?

**Mr. Stephen Rhodes:** Sure. I can coordinate with the auditor's office if there were any other adjustments done to this figure that's in their report from that. If it's straight from the IESO, we should be able to get that, no problem.

**Mr. Peter Tabuns:** That would be great. Thank you.

Going back to OPG, on page 135, there is an identification by the Auditor General of risks that are

going to be coming forward. Particularly, the Auditor General notices “a number of risks on the project with which OPG does not yet have direct experience or that are not fully within its control”—for instance, refurbishing two reactor units at the same time or then going on to unit 3, which has more extensive work to be done.

First off, can you tell me why we're doing two reactors at once when it's riskier, why we couldn't have amended the schedule so we're only doing one reactor at a time?

**Mr. Dietmar Reiner:** The overlapped schedule introduces some new risks, but it takes other risks off the table. It is essentially, from a cost perspective, an optimum way to execute the project and also, actually, from a resource management perspective, the optimum way to execute the project.

Our first schedule that we produced had us have all four units overlap. We changed that as a de-risking option, primarily for our board and our shareholder, to demonstrate that we can execute one unit on budget, on schedule before we commit to future units. But what the overlap allows you to do—the work and the skill and the nature of the work for disassembly is different than reassembly, different tools. The way we envision this going is that you would take a crew that's disassembling a reactor on unit 3, and when they finish that, the way we've staged the schedule, they then prepare to execute that same work on the next unit and then get ready to execute that same work on the unit after.

You essentially utilize that workforce on a more consistent basis over longer periods of time, and they get much better at what they do, versus if you had it all laid out where you finish that work and then you don't get back to it for three years. Then you're essentially into a retraining and getting everybody back up to the same standard. That's why the overlap.

There's also a project management cost associated with a mega-project like this, and certainly less time means more economic—from that perspective, so that's an added benefit.

#### 1400

The risk it introduces, though—the draw on skilled trades is the primary risk. That's the one that we're in the process of looking at options to mitigate and working with Bruce Power to see how we mitigate that. Because when you then overlay the Bruce Power refurbishment, you just multiply that problem.

We've had meetings with Bruce Power where we've laid out our schedules and we looked at what sort of tuning we can do to allow us to flow specific skills between our companies. We've done things already. For example, if you're a tradesperson and you get a security clearance at Bruce Power, you can utilize that at OPG. We don't have to re-do it. So there's an efficiency. We can flow trades back and forth. If you're trained at Bruce Power for certain things, that training is relevant at OPG as well. We've introduced efficiencies like that that allow for the flow of the workforce.

But that overlap, with Bruce Power primarily, does push the demand for trades up, and that's the risk that we

will have to look at mitigating. It tends to be an optimum schedule, that overlap, but not without risk.

**Mr. Peter Tabuns:** I better understand now how you're structuring it, and that's useful.

On page 140 of the Auditor General's report, she talks about the fact that we are paying profits in situations where one would not expect to be paying profits. I'll quote:

"While OPG has not paid contractors for work that does not meet OPG's quality standards"—good—"and has achieved settlements of over \$50 million with contractors as compensation for their involvement in cost overruns and schedule delays to project work so far"—good—"we question the fact that contractors continue to receive or remain eligible to receive their full profit despite OPG providing additional assistance to help them achieve the level of performance needed to earn such profit."

Why are we paying profit to someone when, in fact, it's OPG that's doing the work that's making that possible?

**Mr. Dietmar Reiner:** One of the things that we also recognized early on in the project—we purposefully structured it this way—is that OPG is the project manager. OPG is essentially, I'll call it, the prime contractor in a multi-prime-contracting model and, as a result, does play a role in ensuring there is collaboration with contractors. Contractors understand the work that they're expected to perform and that we support them in executing that work. We will take every measure we can to remove barriers that prevent work from getting executed and to provide support. We directly provide, for example, the radiation protection support. That's an OPG-provided service to our contractors.

Our contracts, in large part—we have a variety of different contract structures, but the major contracts for the reactor component replacement work are what we call a target price contract, where the profits that are paid to the contractor were pre-negotiated based on a volume of work and a timeline for executing that work.

There are disincentive structures in that contract, and the contractor invoices us for the work that they perform. In parallel to that, we run a process to look at how that work is executing relative to the incentives and disincentives, both on schedule and on total cost. There's an agreed-to target price negotiated up front for total cost. If the contractor starts to go above that target price, they actually lose their overheads and profit. They'll repay us that. That incentive mechanism starts at the beginning of the first unit and runs through to the end of the last unit and accrues over time.

In cases where contractors do not perform, there are strong incentives that will result in payment back to OPG. In cases where work is defective, we do not pay. We have a process to do post-payment audits. Also, before invoices are paid, we have a proactive process that looks at what's being invoiced, what's the work that has been done, and are there any disputes associated with that. Those get logged. We have a contract management organization in place that looks at all of those issues and works through them with the contractor.

The thing that I would tell you, and I believe this was highlighted by the Auditor General—actually, in the recommendations, I think the suggestion is that we continue to do this—is that we collaborate with contractors and we provide them with the support that they need to effectively execute the project work. We will continue to do that.

**Mr. Peter Tabuns:** I understand what you're saying, but I have to say that some of what the Auditor General had to say struck me as fairly basic in terms of what the contractors should be doing. She noted, "The contractors did not effectively plan project work to meet OPG's documentation requirements although OPG communicated such requirements to the contractors in advance...."

"The contractors did not effectively monitor the procurement of materials needed for project work to ensure the materials would arrive on time when needed and not cause unnecessary delays or work stoppages." These seem pretty rudimentary to me.

**Mr. Dietmar Reiner:** I explained earlier—to a question about how what seems rudimentary, as you say, and pretty basic in the nuclear arena—how the process is a lot more complicated because of the qualification process needed to get a supply chain mobilized. Our contractors execute that with their sub-suppliers, in large part. Those delays, any delays attributed to the project as a result of that, get caught in this incentive and disincentive mechanism that we track. That will get normalized with the contractors. We track amounts owed back to OPG or from OPG to contractors, and that gets adjusted as we go. We settle a lot of these things as we go, so there is no intention on our part to pay contractors profits for work that was not executed.

**Mr. Peter Tabuns:** Or to pay them when they fall below standards, like making sure materials arrive on time on the site when they're responsible for them being on the site. So I have assurance that they will actually have to pay for these things? Where they cause problems, they will actually have to pay; is that correct?

**Mr. Dietmar Reiner:** Well, they would not earn their full profits in those cases. That's what the incentive mechanism does to the contractors.

Now, we also have to be cautious in the process. Part of this does come back to OPG in recognizing the effort that it takes, in the case of nuclear-grade components, to qualify a fabricator of a component, to get that certified and to get it manufactured. One of the things that we as OPG have got to look at, which is why we provide additional resources to help our contractors, is to not have an unreasonable expectation that can't actually be executed.

**Mr. Peter Tabuns:** Just following on on that, on page 145 the Auditor General talks about safety issues and the fact that the dropping of "a bag containing pieces of metal from almost 35 feet above ground, almost hitting another worker," led to a contractor stopping "800 of its staff from working on the project for two days...." The contractor wanted to sort things out in terms of safety, but the Auditor General notes, "The contractor's staff were still paid for these two days when they did not work, which cost OPG

over \$700,000.” So why is OPG getting stuck with the bill for 700,000 bucks?

**Mr. Dietmar Reiner:** We pay our contractors in accordance with the contract models. In that particular case and that event, that was the right decision for the contractor to make.

**Mr. Peter Tabuns:** I agree.

**Mr. Dietmar Reiner:** We were seeing a trend in dropped objects. It was a right decision to make. They took the time to meet face to face with every one of their supervisors and trades foremen and sub-foremen to reinforce the need to be rigorous with pre-job briefs, to reinforce the safety messages, to get the feedback from trades folks working on the job on potential opportunities to ensure that safety issues are dealt with. Taking that time, from our perspective, was the right thing to do.

1410

The position that was taken in that particular circumstance, that stand-down—the contractor had made that decision, and we supported it. They stood all trades down. If you put yourself in the shoes of the tradesperson, “I didn’t get paid today for something that somebody else did,” when we took the whole thing into consideration, we said, “We will pay the costs associated with that.”

Profits and overheads, though, would get captured in this incentive mechanism that I talked about. So during that period of time, there is no productive work that gets executed. That all gets rolled into the final schedule and cost disincentive that the contractor will have to pay at the end of the project, when we get through the units.

**Mr. Peter Tabuns:** I absolutely think it makes sense that the contractor shut things down and went through things thoroughly—

**The Chair (Ms. Catherine Fife):** Two minutes.

**Mr. Peter Tabuns:** —but I would think that the contractor is responsible for ensuring safety on site and bears the cost accordingly. I’m glad that you supported it. I’m glad the contractor took the action. But I don’t see why the contractor shouldn’t pay the full shot. It doesn’t make sense to me.

**Mr. Ken Hartwick:** Yes, I think in part—because I agree with your comment that ultimately we’re responsible for the safety performance on the site. Whether it’s a contractor or an employee, it’s our site. Really, in consultation with the contractor in deciding to do the stand-down, as Dietmar described, it was both educational and reinforcement of messages across the contractor staff and our own at the same time. Again, you look to the relative benefit in doing that and ensuring that those people who are part of that incident, but more importantly, across the construction project itself, stay engaged. The economics of that are actually very positive by keeping that broad group engaged and keeping them at a level where they come back from the stand-down recognizing how important it is to us as the owner of the site, and their employers, that we respect their safety.

I think it’s a safety element first, but there’s also an economic part to it that we thought beneficial long-term to what we’re trying to do.

**The Chair (Ms. Catherine Fife):** Thirty seconds.

**Mr. Peter Tabuns:** I think it was correct to shut things down. I think it was correct for the employer to meet with the staff, meet with the supervisors and clear things up. But in the end, they’re the ones who are supervising on the ground, they’re the ones who should be carrying the can for this, and they should have been the ones to pay. It ain’t gonna change anything now, but I don’t see why on earth OPG would pay and not simply leave the whole burden to the employer, who had the responsibility in the first place to make sure that things were safe.

**The Chair (Ms. Catherine Fife):** Okay. Thank you very much. We’re going to leave it there.

Just so the committee understands, the government side has 13 minutes left in this cycle and then the opposition will have 13 minutes. We’re going to go to MPP Surma and then MPP Ghamari.

**Miss Kinga Surma:** Great; thank you very much, Chair.

I am very interested in recommendation 2. As you know, the skilled trades file is an important one to this government. Can you tell this committee what initiative programs that OPG has to focus on skilled trades? I know that previously you mentioned collaborating with Build-Force Canada and visits from schools. Is there anything else that you would like to share?

**Mr. Dietmar Reiner:** We have got a tripartite agreement in place with Durham College and the Boilermakers. That is a specific initiative, and that initiative is really focused on doing some pre-apprentice training to fast-track. We’re looking at a total of 100 Boilermaker apprentices that we would like to bring in through this fast-track program. That’s in partnership with Durham College and the Boilermakers.

I touched on this one a bit earlier: We’ve got a partnership with the Peterborough Victoria Northumberland and Clarington Catholic District School Board. That was really to arm teachers and guidance counsellors with things like this—I had somebody pass me a pamphlet here. This one is entitled Launch Your Career as a Boilermaker, right?

**The Chair (Ms. Catherine Fife):** Perhaps we can pass that around so people can have a look at it.

**Mr. Dietmar Reiner:** We provide that information to them. We give them the basic background. We help them establish connections with union leadership, and through that partnership the teachers and guidance counsellors are now taking that into their classes.

We’ve also got the partnership with General Motors, Bruce Power and Durham College. Durham College plays into this one as well because we are looking at opportunities to take workers who are already skilled that are going to be unemployed as a result of the plant closure in Oshawa—to see what we can do to more rapidly re-skill them and provide them with an opportunity on the project. So that’s another one.

The Indigenous outreach, Kagita Mikam, is an Indigenous employment centre. It’s a service that’s provided to Indigenous peoples to help them navigate the complexity of some of the processes associated with becoming an

apprentice or with working in a nuclear power plant. You need to meet a security clearance, for example. Some of the difficulties are just understanding the paperwork and how to fill it out correctly, how to do it efficiently, making those right connections. We've got a partnership specifically with Kagita Mikam to help us with that.

**The Chair (Ms. Catherine Fife):** There are 10 more minutes left in this cycle, so if you want other MPPs to have a chance to speak—

**Miss Kinga Surma:** Yes, I just have one more question.

**The Chair (Ms. Catherine Fife):** Okay, thank you.

**Miss Kinga Surma:** Thank you very much. Can you also elaborate on any specific initiatives for women in nuclear? You kind of touched on that a little bit as well, but if there was anything else you would like to add.

**Mr. Dietmar Reiner:** Women in trades is a specific target area for us. When we do the outreach on trades, the way we do that is we actually draw out of the trades that work at the Darlington project. We draw women out. We have them work with us at some of the open house activities and some of the outreach programs so that they can communicate and share their experience and share the fact that they can have a balanced lifestyle, raise families and still be a woman working in a trade that's a non-traditional career path.

Internally in OPG—Ken may want to comment more on this—diversity is very high on our radar, very important. Women in leadership positions are very important to us. I have two woman vice-presidents who report to me. One runs my engineering department and the other one runs my contract management and project assurance department. We're actively pursuing opportunities to help accelerate women in leadership positions.

**Mr. Ken Hartwick:** If I could just add a comment on diversity and women specifically: It is a clear focus of the company across the management ranks. Approximately 30% of all of the executive management group are women. Our goal within the next three to four years is to have that at 50-50. Some of that requires changes. If you look to the Canadian Nuclear Safety Commission, to go through and become a licensed operator is a seven-year process. So it's a barrier for women who potentially want to have families, because you can't have breaks as you go. There are very, very limited breaks. It's working also with our regulators, with Bruce Power, with NB Power, to effect changes there that allow key positions at a nuclear plant to then be more reflective of a higher level of diversity.

**The Chair (Ms. Catherine Fife):** MPP Ghamari?

**Ms. Goldie Ghamari:** Thank you. I'm going to kind of preface this question. A couple of months ago I toured a company in Ottawa called Nordion. I see you're familiar with Nordion. They are pretty much the only medical isotope provider in the world. They told me that their only competition, really, in supplying the globe with medical isotopes are the governments of Russia and China, so in the private sector they're really the only company. They're an Ontario company. They have all their employees here. They're a really good made-in-Ontario success story. My

understanding is that they have relationships with both OPG as well as Bruce Power in terms of using their nuclear reactors.

Could you please elaborate a little bit on the role of Ontario's nuclear reactors, what role they play in the production of medical isotopes and how the supply of medical isotopes could be benefited by the nuclear refurbishment of Darlington?

1420

**Mr. Ken Hartwick:** Sure. I think, as you mentioned on the medical isotopes—there's a series of isotopes. Cobalt-60 is the biggest one that Nordion directly deals with, which is used a lot for sterilization of medical ware, equipment etc., which is a very important element to be able to do across—and as you said, there are two other primary sources, being Russian or Chinese. Both we and Bruce Power have worked extensively with Nordion on that particular isotope to continue to ensure that the supply of it is there going forward.

I think, as importantly, there are several other isotopes that are now being examined by other parties, including Nordion, around molybdenum-99, which, again, is a very short-lived isotope that lasts a very short period of time, so you've got to pull it out of the reactor very quickly, process it—which BWXT and Nordion do—and then it's used for treatment of patients. I think both we and Bruce view this as a key—it's called a "side element" that a nuclear reactor can provide. But it's incredibly important for both Canada and then, I think, broadly, in the US, where a lot of these isotopes are ultimately used.

Your point is a good one, that we want to support the Canadian part of the development of the isotopes I mentioned as well as others that can be used for medical purposes, to ensure that the supply is there. It's helpful both in Ontario and Canada and then other parts of the world that Nordion also participates in.

**Ms. Goldie Ghamari:** What sort of strategy do you have in place? My understanding is, right now they are using the Pickering plant's nuclear reactor, but Pickering is going to be shutting down in 2024. With Darlington opening up in 2026, it seems like there's going to be a bit of a two-year gap where they're not going to be able to use nuclear reactors. Is there any sort of plan or strategy in place?

**Mr. Ken Hartwick:** There is. For the first unit coming back, at Darlington—which we've publicly announced, a development of using that reactor for some of the newer isotopes so that we can expand it. Our goal, along with Bruce Power, is to ensure that there's no interruption. I think if we go back—my years will be out of date—a number of years ago, we did have an interruption when we took out a couple of the Pickering units, the first two that retired. Now we, in conjunction with Nordion, in conjunction with Bruce, are ensuring that we can use the new refurbished reactor to produce some of the new isotopes. That work is actually under way now, to be able to utilize it.

But again, the timetable is still out a few years, but the planning and the engineering and the process to get there is well under way.

**Ms. Goldie Ghamari:** Great. Thank you. And just because we're running out of time, I'd like to go to another question. Could you please just elaborate a little bit more on the key economic benefits of nuclear refurbishment? There seems to be a lot of rhetoric around, "This refurbishment is going to increase the price of nuclear in the short term." But then people don't really focus on what the Financial Accountability Officer said, which is that once refurbishment is done, then the price would then decrease to account for that. Could you just talk a little bit about that and maybe just clarify that?

**Mr. Ken Hartwick:** Sure. As the DM has mentioned, we look across the refurbishment lifespan and we think the power will be in that seven-to-eight-cent range. Once the refurbishment is complete, the station operates for 30 years. Obviously, a key element of that, which we are very confident in, is being able to bring the units back—both unit 2, which has been the focus of the Auditor General's report, but as well, more broadly, the other three units—to bring them back into service on schedule, on budget, which is what we feel very comfortable with right now, and to ensure that we're able to achieve the economics that were supported by the Financial Accountability Office.

**The Chair (Ms. Catherine Fife):** Two minutes.

**Ms. Goldie Ghamari:** Thank you.

Just to follow up on that: The auditor has reported that OPG is incurring additional costs as it provides assistance to contractors and completing their work. Obviously, part of our responsibility is to ensure that taxpayer money is being respected. I see here that, in response to that concern, OPG tracks costs associated with the support provided and retains contractual rights to recover these amounts at a later date. Could you just maybe clarify or expand a little bit on that, on what sort of mechanisms you have in place to recover any overpayments made to the contractors?

**Mr. Dietmar Reiner:** This dovetails a little bit with the answer that I previously provided. One of the mechanisms, which is the longer-term mechanism, is tied into the incentives and disincentives in our contracts, which roll forward as work gets executed. Then a final profit and overhead is determined which is exactly reflective of the performance over the long run. But we have other processes in place that ensure that there aren't any overbillings, so we do things like assess all invoices before they're paid, match the invoices up with work actually performed so that we're not paying for things that weren't done. We also conduct post-payment audits. The post-payment audits are really geared towards looking at, were there overpayments made on things like statutory payments, unemployment insurance premiums, that sort of thing.

**Ms. Goldie Ghamari:** So then would you say that Ontarians can rest assured that their taxpayer money is being spent wisely and that any sort of overpayments will be recovered?

**Mr. Dietmar Reiner:** Yes.

**The Chair (Ms. Catherine Fife):** Thank you very much. That ends that 13 minutes of questions. Moving now to the last session: MPP Morrison.

**Ms. Suze Morrison:** I'd like to chat a little bit about the contractors on the project. Can you tell me a little bit about how the selection of SNC-Lavalin and Aecon as the joint contractors for the project was arrived at?

**Mr. Dietmar Reiner:** As part of the planning process that started round about in 2010—not part of the initial feasibility assessment—we laid out our strategy for how we would subdivide work before we went to market to procure. The reactor component—replacement and removal work—was one of those packages. It's the largest contract package. We bid that out. There were in total, I believe, seven responses. We then took those seven responses through a process to educate them on what the scope of work was that we were looking for and what sort of capability they would need to have in order to execute that work.

SNC-Lavalin and, at the time, Candu Energy—Candu Energy Inc. is now owned by SNC-Lavalin; that purchase occurred sort of midway through the process. Then, through that process there were consortiums that were formed amongst the seven players to address what we were after, which was an engineer-procure-construct contract structure. We wanted one entity that could provide the sophisticated engineering work that was required to develop things like tooling specifications for components, that sort of thing, as well as execute the procurement of the components and all the materials that were utilized on the job, as well as manage the construction work.

So that requirement in this engineer-procure-construct arrangement resulted in partnerships developing, and Aecon and SNC-Lavalin is one of those partnerships that developed through that process. We then shortlisted, through our prequalification process; I believe at the time it was down to three. Candu Energy at that time was separate still because it was still federally owned. When we took those three through—so we ran a parallel process. Our objective was to take those three entities through the contracting process to see where we would get to on terms, conditions, capability, risk and cost. Midway through that process, the acquisition of Candu Energy occurred, and that took it down to two entities—

**Ms. Suze Morrison:** Sorry to interrupt: Candu was previously federally owned?

**Mr. Dietmar Reiner:** It was previously federally owned.

**Ms. Suze Morrison:** And then was sold to SNC-Lavalin.

**Mr. Dietmar Reiner:** And was sold to SNC-Lavalin.

**Ms. Suze Morrison:** Mid-process.

**Mr. Dietmar Reiner:** Yes.

1430

**Ms. Suze Morrison:** Okay.

In your opinion, do you think that throughout this process—appreciating the sophistication, expertise and complexity of this project, how many firms in Canada would you say, whether they tendered or not, would have been capable of this sophisticated of a project?

**Mr. Dietmar Reiner:** Given the size, the complexity and the nuclear element, it does lend itself to larger players

that have the more sophisticated engineering capability; but the process is open to anyone. I will tell you that outside of those prime contractors, there are a lot of subcontractors that are involved underneath the prime relationships that we have that draw in a lot more partnerships and actually leverage the supply chain that's out there. But the tendering process probably lends itself to getting the more sophisticated players and, certainly, our process for selection, because what we're interested in is selecting a contractor that can successfully execute the project. So it becomes very important to us what their experience is on managing mega-projects, what their nuclear capability is, what their engineering sophistication is. Those become important factors.

**Ms. Suze Morrison:** Yes, absolutely.

My next question is, considering that a large part of the scope of the audit was better understanding the risks—the future potential risks and how to mitigate them going forward to make sure that this project is successful—and considering the recent dealings of SNC-Lavalin in our national news cycle and the charges that they're currently facing—we've seen some news reports that say that if convicted of the charges that they're facing, as a company SNC-Lavalin, worst-case scenario, could be facing bankruptcy, which could fall within the timeline of this project, considering the length of this project. Considering the fact that there are so few contractors that have the sophistication and the experience to manage this level of a project, what work are you undertaking from a risk management perspective should there become a major organizational viability issue with SNC-Lavalin as a corporation? What processes are you undertaking to mitigate that potential risk?

**Mr. Ken Hartwick:** Maybe I'll start first on the overarching view of risk, because I think one of the elements we found very valuable in the Auditor General's report is both the identification of risks, to ensure as an organization that we're spending the time to assess those risks, and that risks change. They change to the positive sometimes as you learn more; and they also re-emerge in different forms, maybe to the SNC point that you're raising.

What we took a lot from the report was that you don't have a static set of risks. You have to spend the time, all the time, assessing these on an ongoing basis. I think across all the contractor group, we do exactly that. It's always the risk of: What if someone has a financial problem? What if someone loses interest in being involved in the industry? What if we have constraints with Bruce Power and us needing the same resource from the same supplier, vendor or contractor?

Our whole process is driven around the "what if". Hopefully none of them ever transpires, so that it's academic, but usually some do. I think, to us, one of the real takeaways out of this is that, first of all, we think we have a very robust process to begin with, but you have to be doing it every day on every part of what we're doing, which I think is what the AG really pointed out or encouraged us to ensure we were doing to the level we're doing.

On SNC, specifically around the engineering—

**Mr. Dietmar Reiner:** Yes, certainly, as Ken said, we wouldn't be doing our jobs if we didn't have this on our radar.

**Ms. Suze Morrison:** I hope so.

**Mr. Dietmar Reiner:** And it is on our radar. We lay out specific contingency plans to deal with any sort of variety of outcomes that might result in this particular situation or any other that we might encounter. We will look at engineering capability, what might the impact be.

I'll tell you that as time progresses the risk profile changes. We've got tooling designed and built; we've utilized it and it works well. We've got engineering specifications. We've got suppliers now in the supply chain that can fabricate components. If something were to happen that made a big contractor like an SNC-Lavalin unavailable to us for whatever reason, in our view we could continue to execute the project, and we'd expect to still execute it within the \$12.8 billion.

**Ms. Suze Morrison:** And on time?

**Mr. Dietmar Reiner:** And on time, yes.

**Ms. Suze Morrison:** That's good to hear. I had a few other questions, again relating to contracting. I just had a few questions about the staff who were seconded to one of the contractors that was mentioned in the report. Can you explain a little bit about why those staff were seconded and why that cost was absorbed by OPG and not the contractors themselves?

**Mr. Dietmar Reiner:** The secondment arrangement is one that we do utilize. What it prevents is the contractor hiring our people, and so the collaboration becomes important. If they were to hire our people and then just bill us back for them, I'd probably end up paying more than if I kept them on my payroll and I seconded them to the contractor. We always look at opportunities like that. It's good for a multitude of reasons. It's good development for our people. In some cases, we have specific experience that the contractor may not have. It's desirable for us, where we say, "Look, we've got people. We think they're better utilized working for you than working for us. We want to keep them on our payroll. We'll continue to pay them," so there's no cost that gets charged to us by the contractor for that level of support, or no profit. We bear those costs, but it's a good thing to do for the project overall. We undergo those kinds of arrangements.

In fact, we do exactly the same thing with Bruce Power. We have seconded staff to their organization who stay on our payroll; they have seconded staff to our organization, the idea being that we get the benefit of that additional capability, and they get the benefit of the learning that then goes back, and it's the same with the contractors.

**Ms. Suze Morrison:** Okay. I don't think I had another question.

**Mr. Peter Tabuns:** I don't have any further questions.

**The Chair (Ms. Catherine Fife):** Okay. That's good. There were two minutes left, but okay.

Thank you very much. I think we all now know that we need more tradespeople so that we don't have to recruit from Ireland, right?

**Mr. Michael Parsa:** If there are an extra two minutes, can one of my colleagues—

**The Chair (Ms. Catherine Fife):** No, it goes to this side, sorry. But we'll have to talk about how this all played out.

I want to thank all of you for being here this afternoon and for taking the time to explain and answer the questions of the committee members.

I want to remind folks that next Wednesday we will be reviewing the Fair Hydro Plan, so that's something to look forward to.

At this time, the committee will go in camera to do report writing, so I would ask all members of the public to leave the room. Have a good day.

This portion of this meeting is adjourned.

*The committee continued in closed session at 1438.*

## **STANDING COMMITTEE ON PUBLIC ACCOUNTS**

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### **Substitutions / Membres remplaçants**

Mr. Paul Calandra (Markham–Stouffville PC)

Ms. Donna Skelly (Flamborough–Glanbrook PC)

Mr. Peter Tabuns (Toronto–Danforth ND)

### **Also taking part / Autres participants et participantes**

Ms. Bonnie Lysyk, Auditor General

### **Clerk / Greffier**

Mr. Christopher Tyrell

### **Staff / Personnel**

Mr. Ian Morris, research officer,  
Research Services