

Elson Advocacy

March 23, 2021

BY EMAIL AND RESS

Ms. Christine Long

Board Secretary

Ontario Energy Board

2300 Yonge Street, Suite 2700, P.O. Box 2319

Toronto, Ontario M4P 1E4

Dear Ms. Long:

Re: EB-2020-0290 Ontario Power Generation Payment Amounts Application

Enclosed please find the interrogatories of Environmental Defence in the above matter.

Yours truly,



Kent Elson

cc: Parties in the above proceeding

**Ontario Power Generation
EB-2020-0290
Payment Amounts Application**

Interrogatories of Environmental Defence

Interrogatory # A1-ED-1

Reference: Exhibit A1, Tab 3, Schedule 1

Preamble: OPG is “striving to become a net-zero carbon company by 2040” (Exhibit A1, Tab 3, Schedule 1)

“OPG will continue to be a climate leader by investing in and implementing CO2 reductions and offsets to achieve net-zero carbon emissions by 2040”, (*OPG, Building A Brighter Tomorrow: Our Climate Change Plan*, page 14)

Questions:

- (a) Please provide OPG's actual/forecast GHG pollution (megatonnes or MT) for each year from 2020 to 2040 inclusive. Please provide both totals and a breakdown by category (e.g., fossil fuel generation, company fleet, buildings, etc.).
- (b) Please provide OPG's actual/forecast GHG offsets (MT) for each year from 2020 to 2040 inclusive.
- (c) Please provide OPG's actual/forecast expenditures on GHG pollution reduction actions for each year from 2020 to 2040 inclusive. Please provide OPG's actual/forecast annual reductions in GHG pollution as a result of these expenditures.
- (d) Please provide OPG's actual/forecast expenditures on GHG pollution offsets for each year from 2020 to 2040 inclusive. Please provide OPG's actual/forecast annual GHG offsets (MT) as a result of these expenditures.
- (e) For each year from 2020 to 2026 inclusive please provide the total cost and annual GHG reductions and offsets (MT) from each of its GHG pollution reduction and offset programs (e.g., tree planting, wetland restoration).
- (f) Please provide a table with a forecast as far into the future as possible of the GHGs emitted by each of OPG's generation stations.

Interrogatory # A1-ED-2

Reference: Exhibit A1, Tab 2, Schedule 2

Preamble: OPG proposes to defer recovery of the following amounts of approved nuclear revenue requirement: \$238.9M in 2022, \$297.5M in 2023, \$164.7M in 2024, \$103.4M in 2025 and \$(44.8)M in 2026.

Questions:

- (a) Please describe how these deferred costs will be financed (e.g., debt vs. equity, the rates, etc.).
- (b) Please provide a full forecast of the financing costs of this deferral.
- (c) Please provide an estimate of the payment amounts that OPG would require for the nuclear facilities if the rate smoothing were not to take place.

Interrogatory # A1-ED-3

Reference: Ex. A1-11-1 Attachment 1 (SBG Study)

Questions:

- (a) Please describe the degree to which the electricity system costs associated with SBG are included in the cost of nuclear power (\$/MWh) in OPG's nuclear benchmarking studies.
- (b) Please describe the impact of SBG on the HOEP.
- (c) What percent of the hours in the past 3 years had a \$0 or negative HOEP?
- (d) How does a \$0 or negative HOEP impact an unregulated electricity generator?
- (e) How does a \$0 or negative HOEP impact the cost-effectiveness of wind, solar, and storage, respectively?
- (f) Please describe how demand response could be used to reduce SBG.
- (g) Please describe how battery storage could be used to reduce SBG.
- (h) Please describe how power exchange agreements with Quebec have been used to reduce SBG.

Interrogatory # A1-ED-4

Reference: Ex. A1-11-1 Attachment 1 (SBG Study)

Please provide:

- (a) Ontario's surplus base-load generation (MWh) forecast to occur in each year from 2021 to 2026 with and without the Pickering life extension;
- (b) Ontario's curtailed water power generation (MWh) forecast to occur in each year from 2021 to 2026 with and without the Pickering life extension;
- (c) Ontario's curtailed wind power generation (MWh) forecast to occur in each year from 2021 to 2026 with and without the Pickering life extension; and
- (d) Ontario's curtailed solar power generation (MWh) forecast to occur in each year from 2021 to 2026 with and without the Pickering life extension.

Interrogatory # D2-ED-5

Reference: Ex. D2-2-7

Question:

- (a) According to Ex. D2-2-7, Attachment 1, page 4: the forecast total budget for the Darlington Refurbishment Project is \$12.8 billion. Please provide OPG's forecast cumulative capital spending on the Darlington Refurbishment Project, by quarter, from the first quarter of 2021 to the last quarter of 2026.

Interrogatory # D2-ED-6

Reference: Ex. D2-2-7

Questions:

- (a) Please provide a table comparing the Darlington refurbishment schedule: (i) at the time of the previous payment amounts application; and (ii) currently. Please provide this on a unit-by-unit basis.
- (b) Please describe the dates at which off-ramps can be exercised with respect to the units at Darlington (if any).
- (c) Who will decide whether to exercise any off-ramps?
- (d) What factors will be considered?
- (e) Please provide any reports to the OPG Board of Directors regarding potential off-ramps for the Darlington units.

Interrogatory # E2-ED-7

Reference: Ex. E2-1-1, Table 1

Question:

- (a) Please provide the Darlington NGS annual production forecast (TWh) for each year from 2027 to 2041 inclusive.

Interrogatory # D2-ED-8

Reference: Exhibit D2, Tab 2, Schedule 1, Page 3

Preamble:

“The successful completion of the Unit 2 refurbishment on budget and reasonably on schedule represented a significant achievement in mega-project execution for OPG.”

Questions:

- (a) Please provide the total budget figures and total actual spending figures underlying the above statement. Please provide this in a summary table, not a reference to another portion of the evidence.

- (b) Please provide the forecast completion date versus the actual completion date. Please provide these in as much specific detail as possible.
- (c) Please provide the interest cost arising from the schedule delay. Please confirm whether that amount is included in the amount referred to in (a).
- (d) Please estimate the MWh that would have been produced by Unit 2 had it been completed on schedule versus the actual date.
- (e) Please estimate the value of the MWh referred to in (d). Please confirm whether that amount is included in the amount referred to in (a).
- (f) Please provide the total days out of service for Unit 2 forecast versus actual days out of service for the refurbishment.
- (g) How many MWh can Unit 2 produce in 24 hours?

Interrogatory # F2-ED-9

Reference: Exhibit F2, Tab 1, Schedule 1

Preamble: The benchmarking indicates “3-Year Total Generating Costs per MWh (\$ per Net MWh)” of \$62.39 for Pickering

Questions:

- (a) For each of the past 5 years, please provide a table showing Ontario’s 40 highest electricity demand hours, in order, and for each of those hours indicate: (i) whether Pickering was in service; (ii) its output; (iii) if it was not in-service, in whole or in part, whether that was planned or unplanned; and (iv) which units were out-of-service.
- (b) For each of the past 5 years, please provide the number of hours in which Pickering was not fully in-service due to: (i) a planned outage; and (ii) an unplanned outage.
- (c) If Pickering is out-of-service due to an unplanned outage at the time of peak electricity demand in Ontario, how is that deficit in electricity supply made up?
- (d) If Pickering is out-of-service due to a planned outage at the time of peak electricity demand in Ontario, how is that deficit in electricity supply made up?
- (e) For the purpose of estimating resource adequacy, what percent of the time is Pickering assumed to be in service?
- (f) For the purpose of estimating resource adequacy, is Pickering’s capacity assumed to be available at 100% or a lesser amount?

Interrogatory # F2-ED-10

Reference: Exhibit F2, Tab 1, Schedule 1, Page 24-25

Preamble:

“In EB-2016-0152, OPG presented the Pickering Extended Operations initiative aimed at operating Pickering Units 1 and 4 to 2022 and Pickering Units 5-8 to 2024 (EB-2016-

0152, Ex. F2-2-3). OPG expects this initiative will be completed by 2021 at a total cost of \$307M, consistent with the forecast presented in EB-2016-0152.

This application reflects OPG's plans to safely optimize the shutdown 1 of Pickering by operating all six units until September 2024, five of the six units through 2024 and the remaining four units until December 2025, as per the 2020-2026 Business Plan ("Optimization"). OPG will require CNSC approval to operate the remaining four units past 2024 until December 2025."

Questions:

(a) Please complete the following table:

Planned Further Life Extension of Pickering Units			
	Shut Down Date per EB-2016-0152	Shut Down Date per Current Proposals	Duration of Proposed Extension
Unit 1			
Unit 4			
Unit 5			
Unit 6			
Unit 7			
Unit 8			

- (b) Please provide another version of the above table with additional columns showing the previous shut-down dates that had been set in the past and changed per previous OPG plans and previous payment amounts applications.
- (c) In EB-2016-0152, OPG filed analysis from the IESO regarding the cost-effectiveness of Pickering Extended Operations. Please file any IESO analysis relating to the life extension proposed in the current application. If no such IESO analysis is available, please explain why.
- (d) Please provide the Total Generating Costs per MWh forecast for Pickering for each year until the end of its life, including allocated overheads. Please provide this for the station as a whole and broken out by unit (which is necessary as some units are being shut down earlier).
- (e) Please provide all assumptions underlying these figures in (c), including the assumed generation for each year and the forecast days out-of-service. Please compare those assumptions in a table to the 5-year after generation amount and days out-of-service. Please provide this for the station as a whole and broken out by unit (which is necessary as some units are being shut down earlier).
- (f) With respect to (c), please indicate if any costs relating to Pickering or that could be allocated to Pickering have not been included, itemize those, and provide values for each.

Interrogatory # F2-ED-11

Reference: Exhibit F2, Tab 1, Schedule 1, Page 24-25

Questions:

If Pickering's life were not to be extended as planned by OPG:

- (a) Please provide the best estimate of Ontario's incremental peaking requirements (MW), if any, to achieve compliance with the NPCC resource adequacy criterion in each year from 2021 to 2026 inclusive;
- (b) Please provide the best estimate of Ontario's potential to meet its incremental peaking requirements by electricity imports from neighbouring jurisdictions for each year from 2021 to 2026 inclusive; and
- (c) Please provide the best estimate of Ontario's potential to meet its incremental peaking requirements by demand response resources for each year from 2021 to 2026 inclusive.

Please obtain this information from the IESO if necessary.

Interrogatory # F2-ED-12

Reference: Exhibit F2, Tab 1, Schedule 1, Page 24-25

Preamble:

"In EB-2016-0152, OPG presented the Pickering Extended Operations initiative aimed at operating Pickering Units 1 and 4 to 2022 and Pickering Units 5-8 to 2024 (EB-2016-0152, Ex. F2-2-3). OPG expects this initiative will be completed by 2021 at a total cost of \$307M, consistent with the forecast presented in EB-2016-0152.

This application reflects OPG's plans to safely optimize the shutdown 1 of Pickering by operating all six units until September 2024, five of the six units through 2024 and the remaining four units until December 2025, as per the 2020-2026 Business Plan ("Optimization"). OPG will require CNSC approval to operate the remaining four units past 2024 until December 2025."

Questions:

- (a) Please provide the total cost per MWh forecast for Pickering for each year until the end of its life, excluding any sunk capital costs. Please provide this for the station as a whole and broken out by unit (which is necessary as some units are being shut down earlier).
- (b) Please provide all assumptions underlying these figures in (c), including the assumed generation for each year and the forecast days out-of-service. Please compare those assumptions in a table to the 5-year after generation amount and days out-of-service. Please provide this for the station as a whole and broken out by unit (which is necessary as some units are being shut down earlier).
- (c) With respect to (a), please indicate if any costs relating to Pickering or that could be allocated to Pickering have not been included, itemize those, and provide values for each.

Interrogatory # F2-ED-13

Reference: Exhibit F2, Tab 1, Schedule 1, Page 24-25

Preamble:

“In EB-2016-0152, OPG presented the Pickering Extended Operations initiative aimed at operating Pickering Units 1 and 4 to 2022 and Pickering Units 5-8 to 2024 (EB-2016-0152, Ex. F2-2-3). OPG expects this initiative will be completed by 2021 at a total cost of \$307M, consistent with the forecast presented in EB-2016-0152.

This application reflects OPG’s plans to safely optimize the shutdown 1 of Pickering by operating all six units until September 2024, five of the six units through 2024 and the remaining four units until December 2025, as per the 2020-2026 Business Plan (“Optimization”). OPG will require CNSC approval to operate the remaining four units past 2024 until December 2025.”

Questions:

- (a) Please explain the prudence and reasonableness of extending the life of Pickering as outlined above. Please specifically address the impact on electricity prices in comparison to the originally-planned closure date. Please include all calculations and assumptions.
- (b) Please provide all internal OPG analysis showing the prudence and reasonableness of extending the life of Pickering, including any reports to the OPG Board of Directors on the subject and internal cost-benefit analyses.
- (c) Will the power produced by Pickering in its extended life be less expensive than alternatives? Please explain OPG’s answer with detailed calculations and sources.
- (d) If OPG cannot establish that the price of power from Pickering will be less expensive than alternatives, does it take the position that it should still be able to recoup the full cost of operating Pickering? If yes, why?

Interrogatory # F2-ED-14

Reference: Exhibit F2, Tab 1, Schedule 1, Page 24-25

Preamble:

“In EB-2016-0152, OPG presented the Pickering Extended Operations initiative aimed at operating Pickering Units 1 and 4 to 2022 and Pickering Units 5-8 to 2024 (EB-2016-0152, Ex. F2-2-3). OPG expects this initiative will be completed by 2021 at a total cost of \$307M, consistent with the forecast presented in EB-2016-0152.

This application reflects OPG’s plans to safely optimize the shutdown 1 of Pickering by operating all six units until September 2024, five of the six units through 2024 and the remaining four units until December 2025, as per the 2020-2026 Business Plan (“Optimization”). OPG will require CNSC approval to operate the remaining four units past 2024 until December 2025.”

Questions:

- (a) Does OPG strive to deliver power from each of its generation facilities at a cost that is less than alternative electricity sources?
- (b) Does OPG believe the OEB is precluded from considering the reasonableness of its payment amounts requests with reference in part to the cost of electricity from alternative electricity sources?
- (c) In particular, does OPG believe that it should be paid to invest in the extended operation of Pickering even if the power it produces would be more expensive than alternatives? If yes, please explain why.
- (d) Does OPG believe the OEB is precluded from considering whether OPG should be paid the entire proposed cost to invest in the extended operation of Pickering even if the power it produces would be more expensive than alternatives?
- (e) According to Lazard, the cost of offshore wind is 8.6 cents per kWh (US \$), which is approximately 11.2 ¢/kWh CAD. Lazard, *Lazard's Levelized Cost of Energy Analysis – Version 14.0 (October 2020)* page 2.¹ Does OPG have reason to disagree? If yes, please provide OPG's best estimate.
- (f) Please file a copy of the Lazard report so it can be referred to with an exhibit number in this proceeding.
- (g) Does OPG believe Lazard is a credible organization?
- (h) Does OPG believe the Lazard report cited above is credible?
- (i) According to Lazard, the cost of onshore wind is 2.6 to 5.4 cents per kWh (US \$), which is approximately 3.4 to 7 ¢/kWh CAD. Lazard, *Lazard's Levelized Cost of Energy Analysis – Version 14.0 (October 2020)* page 2. Does OPG have reason to disagree? If yes, please provide OPG's best estimate.
- (j) According to Lazard, the cost of utility scale solar PV is 2.9 to 4.2 cents per kWh (US \$), which is approximately 3.8 to 5.5 ¢/kWh CAD. Lazard, *Lazard's Levelized Cost of Energy Analysis – Version 14.0 (October 2020)* page 2. Does OPG have reason to disagree? If yes, please provide OPG's best estimate.
- (k) On June 22, 2017 Hydro Quebec offered to sell Ontario 8 billion kWh per year, for 20 years, at a price of 6.12 cents per kWh. In August 2017 Hydro Quebec lowered its proposed price to 5 cents per kWh. Letter from Steve Demers, Vice President, Hydro Quebec to Peter Gregg, CEO, Independent Electricity System Operator, (June 22, 2017); and Pierre Couture, "Hydro Quebec l'Ontario en ligne de mire", *Journal de Montreal*, (August 16, 2017). Does OPG have reason to disagree? If yes, please provide OPG's best estimate of the price of firm electricity imports from Quebec.
- (l) In 2017 the average price of Ontario's spot market electricity purchases from Quebec was 2.2 cents per kWh. Financial Accountability Office of Ontario, *Electricity Trade Agreement: An Assessment of the Ontario-Quebec Electricity Trade Agreement*, (Spring 2018), page 7. Does OPG have reason to disagree? If yes, please provide OPG's best estimate of the price of spot market purchases from Quebec.
- (m) If OPG disagrees, please file a copy of the document referred to above so it can be referred to in an interrogatory response.

¹ <https://www.lazard.com/media/451419/lazards-levelized-cost-of-energy-version-140.pdf>

- (n) In 2017 the Independent Electricity System Operator's (IESO) average levelized unit energy cost (LUEC) of procuring a kWh of electricity savings was 1.69 cents. Independent Electricity System Operator, *2017 Report on Energy-Efficiency Activities*, page 8. Does OPG have reason to disagree? If yes, please provide OPG's best estimate of the cost (LUEC) of electricity conservation.
- (o) A report prepared for the Government of Ontario identified 64 potential offshore wind power sites in the Great Lakes that could produce 111.5 billion kWh of electricity per year.² This is equivalent to 82% of Ontario's total electricity consumption in 2019.³ Does OPG have reason to disagree? If yes, please provide OPG's best estimate of Ontario's off-shore wind power generation potential.
- (p) This MIT paper describes how Hydro Quebec's hydro-electric reservoirs can be used as a low-cost storage solution.⁴ When our wind power production is above average, our surplus wind energy can be exported to Quebec to keep the lights on in Montreal, and Hydro Quebec can store more water in its reservoirs. Conversely, when our wind power generation is below average, Hydro Quebec can use the extra water in its reservoirs to produce electricity for export back to Ontario. Does OPG have reason to disagree? If yes, please describe the extent to which it is technically feasible for Hydro Quebec's hydro-electric reservoirs to be used as a low-cost storage solution.
- (q) Does OPG believe the cost of alternative electricity options is relevant to the amount it is paid for its regulated generation facilities?
- (r) Should OPG be paid for the full cost of its generation facilities even if that cost is higher than alternatives? If yes, why?
- (s) Should electricity ratepayers pay OPG to develop SMRs even if the expected cost of power from SMRs (\$/MWh) is higher than alternatives?
- (t) Should electricity ratepayers pay OPG to develop SMRs even if the expected cost of power from SMRs (\$/MWh) is more than twice as high as alternatives?

Interrogatory # F2-ED-15

Reference: F2-1-1, Attachment 7

Preamble: "The Ontario government is supporting a plan by Ontario Power Generation (OPG) to safely extend the life of the Pickering Nuclear Station."

Questions:

- (a) Please provide a table comparing the wording used by the Government of Ontario in relation to the current plan to extend the life of Pickering versus the wording used in relation to the Pickering Extended Operations at issue in EB-2016-0152.

² Helimax Energy Inc., *Analysis of Future Offshore Wind Farm Development in Ontario*, (April 2008), pages iii, 18 & 19.

³ In 2019 Ontario consumed 135.1 billion kWh. IESO, News Release, "2019 Year in Review", (January 30, 2020).

⁴ Emil Dimanchev, Joshua Hodge and John Parsons, *Two-Way Trade in Green Electrons: Deep Decarbonization of the Northeastern U.S. and the Role of Canadian Hydropower*, MIT Center for Energy and Environmental Policy Research; <http://ceepr.mit.edu/files/papers/2020-003-Brief.pdf>

- (b) Please include Government of Ontario references regarding each project so they can be compared in their context.
- (c) Does OPG take the position that the OEB must accept the need to extend the life of Pickering?
- (d) Does the Ontario Government support the plan to extend Pickering's operations at any cost?
- (e) Please provide all correspondence with the IESO regarding the current plan to extend the life of Pickering, especially any studies or cost-benefit analyses.
- (f) Please provide all correspondence with the Government of Ontario regarding the current plan to extend the life of Pickering, especially any studies or cost-benefit analyses.

Interrogatory # F2-ED-16

Reference: F2-1-1, Attachment 7

Questions:

- (a) What is OPG's contingency plan in the event that the CNSC does not approve the extended operation of Pickering?
- (b) What the IESO's contingency plan in the event that the CNSC does not approve the extended operation of Pickering? Please ask the IESO for this information.
- (c) Please compare the cost of those contingency plans to the cost of continuing to operate Pickering on a \$/MWh basis.
- (d) Please provide an analysis of the costs and benefits of meeting Ontario's peak day generation requirements for each year from 2024 to 2026 inclusive, if the CNSC does not extend Pickering's operating licence, by: a) curtailing natural gas-fired electricity exports; b) procuring more demand response resources; c) procuring more energy efficiency resources; d) importing renewable energy from neighbouring jurisdictions; and e) procuring more Made-in-Ontario green energy; and f) by the least-cost combination of options (a) to (e) inclusive.

Interrogatory # F2-ED-17

Reference: F2-1-1, Attachment 7

Questions:

- (a) Please state for each year from 2021 to 2026 inclusive the quantum of this capacity that is provided by: i) the Pickering Nuclear Station; and ii) the Darlington Nuclear Station according to Ontario's Reserve Margin Requirements.
- (b) Please state the methodology and assumptions, and show the calculations, for estimating Pickering's and Darlington's available capacity (MW) at the time of Ontario's peak annual demand. Please discuss the reasonableness of this in light of their forced outage rates.

Please ask the IESO for this information if needed.

Interrogatory # F2-ED-18

Reference: F2-1-1, Attachment 7

Questions:

Over 2020 to 2026, please provide the best current estimate of:

- (a) Pickering's total installed capacity (MW);
- (b) Pickering's available capacity (MW) at the time of Ontario's peak annual demand;
- (c) Pickering's generation (MWh);
- (d) The avoided generation (MWh), by fuel type, as a result of Pickering's extended operation;
- (e) Pickering's rolling average forced loss rate;
- (f) The installed capacity (MW) of the replacement peaking generation capacity;
- (g) The available capacity (MW) of the replacement peaking generation capacity at the time of Ontario's peak annual demand;
- (h) Pickering's fuel and operating cost per kWh;
- (i) Pickering's incremental capital expenditures to permit its extension;
- (j) Ontario's carbon price; and
- (k) Ontario's incremental peaking requirements (MW) to meet the NPCC resource adequacy criterion if Pickering is not extended.

Interrogatory # F2-ED-19

Reference: F2-1-1, Attachment 7

Questions:

- (a) If the IESO or OPG has analyzed whether the continued operation of Pickering is economic, please provide the assumptions underlying this analysis with respect to the variables:
 - i. Pickering's total installed capacity (MW);
 - ii. Pickering's available capacity (MW) at the time of Ontario's peak annual demand;
 - iii. Pickering's generation (MWh);
 - iv. The avoided generation (MWh), by fuel type, as a result of Pickering's extended operation;
 - v. Pickering's rolling average forced loss rate;
 - vi. The installed capacity (MW) of the replacement peaking generation capacity;
 - vii. The available capacity (MW) of the replacement peaking generation capacity at the time of Ontario's peak annual demand;
 - viii. Pickering's fuel and operating cost per kWh;
 - ix. Pickering's incremental capital expenditures to permit its extension;
 - x. Ontario's carbon price;

- xi. Ontario's incremental peaking requirements (MW) to meet the NPCC resource adequacy criterion if Pickering is not extended; and
- xii. Gas prices.

Interrogatory # F2-ED-20

Reference: F2-1-1, Attachment 7

Preamble: "The updated schedule will provide electricity consumers with emission-free, low-cost energy and allow 4,500 high-quality jobs to remain in Durham region longer."

Questions:

- (a) Please confirm how the above figure was calculated.
- (b) Please confirm what the above figure translates into in terms of person-years FTE.
- (c) Please provide correspondence between OPG and the Government of Ontario regarding the further extension of Pickering's life which details the impacts on jobs.
- (d) Please summarize the impacts on jobs of the Pickering life extension.
- (e) Does OPG believe the jobs number in the above quoted figure is accurate?
- (f) Does OPG's mandate include the creation of jobs?
- (g) Does the OEB's mandate include the creation of jobs?
- (h) Please compare in person-years FTE the jobs that would exist in relation to Pickering over 2024 to 2026 in the scenario where it was shut down in accordance with the plan in the previous payment amounts application versus a scenario where it is shut down in the current plan.
- (i) Please provide a table reconciling the jobs figures in the above reference with the evidence in this application regarding the headcount for Pickering's operations.
- (j) Please break-out the total nuclear FTEs in 2020 to 2026 according to the following categories: i) employees working at the Pickering Nuclear Station, ii) employees working at the Darlington Nuclear Station, iii) employees working at other locations (e.g. head office) in support roles relating Pickering Nuclear Station, and iv) employees working at other locations (e.g. head office) in support roles relating to Darlington Nuclear Station.

Interrogatory # F2-ED-21

Reference: Ex. F2-8-1, page 1

Questions:

- (a) Please provide OPG's forecast/actual annual expenditures, for each year from 2020 to 2030 inclusive with respect to the planning, preparation and building of a SMR at the Darlington site.
- (b) Please provide the forecast size (MW) and total capital cost of the proposed new SMR at Darlington.

- (c) Please provide the forecast in-service and end-of-service dates for the proposed new SMR at Darlington
- (d) Please provide the forecast costs of dismantling and decommissioning the proposed SMR at Darlington.
- (e) Please provide the forecast start and completion dates for the dismantling and decommissioning of the proposed SMR at Darlington.
- (f) Please provide OPG's plans, proposed locations and forecast costs for storing the spent nuclear fuel from the proposed Darlington SMR in the: a) short-term; b) medium-term; and c) long-term.
- (g) Please provide the forecast levelized unit energy cost (LUEC) of the proposed new SMR at Darlington. Please provide a break-out of the LUEC according to the following categories: capital costs, non-fuel operating costs; fuel costs; dismantling and decommissioning costs; and spent nuclear fuel storage costs.

Interrogatory # F2-ED-22

Reference: Ex. F2-8-1

Preamble:

The Canadian nuclear industry is forecasting that the cost of electricity from a SMR will be 16.3 cents per kWh; however they note that if there is a 3% capital cost overrun the cost will rise to 21.5 cents per kWh. Canadian Small Modular Reactor Roadmap Steering Committee (2018), *A Call to Action: A Canadian Roadmap for Small Modular Reactors*, pages 35 and 54.

Questions:

- (a) Please describe OPG's involvement in the steering committee process referred to above.
- (b) Does OPG have any reason to disagree with the estimate of \$16.3 per kWh price of electricity from an SMR discussed above? If yes, please explain why.
- (c) What does OPG believe is a reasonable range of estimates for the price of electricity from SMRs per kWh after accounting for the possibility of cost overruns?

Interrogatory # F2-ED-23

Reference: Ex. F2-8-1

Questions:

- (a) Please provide the total cost of OPG's nuclear generation (\$/MWh) for the past 5 years and as far into the future as is available.
- (b) Please provide the total cost of Bruce Power's nuclear generation (\$/MWh) for the past 5 years and as far into the future as is available.
- (c) Please explain the difference between (a) and (b).
- (d) Why should OPG build SMRs as a regulated business instead of an unregulated business activity?

- (e) Please provide a list of all generators owned by OPG and its subsidiaries as part of its unregulated business.
- (f) Why should electricity consumers bear the costs and risks of developing SMRs instead of the private sector?
- (g) If the SMRs were left to the private sector for development and implementation, would that development and implementation occur? If not, why not?

Interrogatory # F2-ED-24

Reference: Ex. F2-8-1

Questions:

- (a) Where will the nuclear waste from new reactors be stored in the long-term?
- (b) How will the nuclear waste be transported to that long-term storage site?
- (c) Please provide a map showing the potential long-term storage sites and the transportation routes between them and the proposed site for potential new nuclear generation.
- (d) Does OPG feel it is safe to transport nuclear waste on Ontario's highways? If yes, please explain why.
- (e) Does OPG feel it is safe to transport nuclear waste on Ontario's highways indefinitely?
- (f) When the NWMO conducted its review of long-term storage sites for nuclear waste, what was the planned date for end of the production of nuclear waste in Ontario? Please provide an answer with reference to: (i) the NWMO's materials; and (ii) OPG's own knowledge of the subject.
- (g) Does having a single site for long-term storage still make sense if nuclear power will be produced indefinitely and will therefore need to be transported to that site indefinitely.
- (h) Does OPG believe that the storage of long-term nuclear waste is irrelevant to the prudence of building new nuclear reactors?
- (i) What is OPG's estimate of the cost to store all of the waste that will be produced by Pickering and Darlington in a final storage location? Please provide both an annual estimate for as far as possible and a cost over the lifetime of the fuel. Please discuss the confidence with which OPG makes this estimate.
- (j) Please provide a table showing when the costs referred to in (i) will be or have been recovered from ratepayers. Please ensure the answer provides a breakdown between the amounts already recovered and the amounts not recovered.
- (k) Is the amount referred to in (i) included in the \$/MWh figures for nuclear power in OPG's benchmarking studies? If in part no, please provide the amount that is excluded (\$).

Interrogatory # F4-ED-25

Reference: Ex. F4-3-1, Attachment 1, Page 1

Questions:

- (a) Please state the forecast number of FTE staff who will be working at the Pickering Nuclear Station during each year from 2021 to 2026 inclusive.
- (b) Please state the forecast number of FTE staff that will be working at the Darlington Nuclear Station from 2021 to 2026 inclusive.

Interrogatory # F4-ED-26

Reference: Ex. F4-3-1

Preamble: "OPG is currently planning to reduce its workforce by over 3,000 positions, or approximately 30%..." Ex F4-3-1, page 1. See also: F4-3-1, page 22; and F4-3-1, Attachment 1.

Question:

- (a) Please state how many FTE jobs will be reduced between January 1, 2021 and December 31, 2026 due to: i) the closure of the Pickering Nuclear Station; and ii) the completion of the Darlington Refurbishment Project. Please provide totals and a breakdown by category and station-based versus allocated administrative positions.

Interrogatory # H1-ED-27

Reference: H1-1-1, pages 1 and 38.

Questions:

For each of the following deferral/variance accounts please state their forecast balances including interest costs at the end of each calendar year from 2021 to 2026 inclusive:

- (a) Darlington Refurbishment Project component of the Capacity Refurbishment Variance Account;
- (b) The hydro-electric component of the Capacity Refurbishment Variance Account;
- (c) The Fitness For Duty Deferral Account;
- (d) The portion of the Nuclear Development Variance Account related to the preliminary planning and preparation costs incurred for a SMR generating station at the Darlington site;
- (e) The Rate Smoothing Deferral Account;
- (f) The Pickering Closure Deferral Account; and
- (g) All other deferral and variance accounts.

Interrogatory # I1-ED-28

Reference: Ex. I1-1-2, Table 2

Question:

- (a) Ex. I1-1-2, Table 2 provides OPG's proposed Nuclear Payment rates and Nuclear Payment Riders for 2022 to 2026. Please provide OPG's forecast of its: a) nuclear payment amount (\$/MWh); and b) nuclear payment rider (\$/MWh) for each year from 2027 to 2041 inclusive. [N.B. In the previous rate case OPG provided its forecast nuclear base rates for 15 years beyond its rate period. See EB-2016-0152, Ex. N3-1-1, Attachment 2, Table 14.]