

November 9, 2016

BY COURIER (2 COPIES) AND RESS

Ms. Kirsten Walli

Board Secretary

Ontario Energy Board

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

Toronto, Ontario M4P 1E4

Dear Ms. Walli:

Re: EB-2016-0152 – Ontario Power Generation (“OPG”) – Payment Amounts

I am writing pursuant to Procedural Order #1 to provide a description of the subject areas that Environmental Defence will focus on at the technical conference and time estimates.

Environmental Defence intends to ask questions primarily relating to the Darlington refurbishment and the proposed Pickering Extended Operations. A number of specific questions are attached. Environmental Defence has requested that OPG agree to provide responses to these questions, which would greatly reduce the time we require for questions during the technical conference. We also anticipate having other questions relating to these subject areas, including follow up questions to Environmental Defence interrogatory numbers 17, 22, and 25 to 27.

If OPG does not agree to answer the attached questions and it is necessary to go through them at the technical conference, we expect to require 2 hours for each of panel 1 and 2. If those questions can be addressed by way of undertakings, we estimate 45 minutes with panel 1 and 90 minutes with panel 2.

Yours truly,



Kent Elson

Encl.

cc: Applicant and parties in EB-2016-0152

EB-2016-0152

Environmental Defence Written Technical Conference Questions

November 9, 2016

ED Interrogatory #3

The response to this interrogatory indicated that 83% of a 100% cost overrun would be passed on to OPG. If the Darlington cost overrun were to be greater than 100%, will more than 83% of these cost overruns be passed on to OPG? If not, would at least 83% of the cost overruns be passed on to OPG in this scenario? Please use the same assumptions as in the response to ED Interrogatory #3.

ED Interrogatory #5

We asked for Darlington's "annual capacity utilization rates" [i.e., actual output/(3512 MW x 8760 hours/year)], but OPG provided us with the "Unit Capability Factor". Please provide the annual capacity utilization rates.

ED Interrogatory #6

This interrogatory requested the quarterly cumulative capital expenditures for 2017-2020. OPG provided the information for 2017 but not for 2018 to 2020. Please provide a complete response to this interrogatory including the quarterly figures for all years from 2017 to 2020. Please provide this as a revised and updated response so that all the information is clearly laid out in one place.

ED Interrogatory #7

This interrogatory requested OPG's estimate of the probability that the unit 2 refurbishment will exceed its budget of \$4,800.2 M. OPG stated that "OPG does not estimate the probability associated with in-service additions. In-service additions are not analogous to cost estimates." However, OPG indicated in ED interrogatory #1 that the probability of the total refurbishment process exceeding its estimate to be 10%.

OPG has not indicated an impediment to estimating the probability of the unit 2 refurbishment costs exceeding the cost estimate for that unit. Please provide the cost estimate for the unit 2 refurbishment, including interest, escalation, and contingency (if it is different than the in-service addition amount of \$4,800.2M). Please provide an estimate of the probability that the actual cost will exceed that estimate.

ED Interrogatory #10 & ED Interrogatory #11

According to Page 3 of ED Interrogatory #10, the annual capital cost of the Darlington Re-Build is 3.5 cents per kWh assuming: a) a capital cost of \$12.8 billion; b) an average capacity factor of 84.8%; c) a 30 year operating life; and d) a 7% discount rate (see ED Interrogatory #11).

It appears that there may be an error in OPG's number. According to our calculations, amortizing \$12.8 billion over 30 years at 7% entails an annual cost of \$1,021,900,800. The annual output of Darlington, assuming an 84.8% capacity factor, is 26,088,821.76 MWh [3512 MW x 8760 hours x 0.848]. This yields an annual capital cost of 3.9 cents per kWh. Please confirm whether there is indeed an error. If not, please explain. If there is an error, please recalculate the capital cost per kWh for all the scenarios in ED Interrogatories #10 and 11.

ED Interrogatory #13

OPG has not provided an estimate of the probability that some or all of the steam generators will need to be replaced; nor has it provided its best estimate of the cost of replacing them. The fact that OPG believes that the generators will operate reliably does not mean that there is *no* probability that it will turn out that they will need to be replaced. Nor does it mean that the question is irrelevant or need not be answer. Please provide the information requested in this interrogatory.

ED Interrogatory #22

According to this interrogatory response, dismantlement of the Pickering Nuclear Station cannot occur "while the irradiated nuclear fuel is being contained within the station. Therefore, under an immediate dismantlement strategy, the physical act of dismantlement would not begin until in the order of 12 years after the station closure, in order to account for cooling of fuel in wet bays and the full emptying of those wet bays into dry storage containers."

- (a) Is the Darlington Re-Build proceeding while nuclear fuel is being contained within the Darlington Nuclear Station? If yes, why can a re-build proceed in the presence of irradiated fuel while a dismantling cannot?
- (b) Please explain why immediate decommissioning is allowed in other jurisdictions and not in Ontario? Is there anything unique about the technology used by OPG that would prevent immediate decommissioning?

ED Interrogatory #28

- 1. With respect to the first 3 columns in (b) why does Pickering's estimated available capacity in 2020 (3094 MW) equal its installed capacity? That is, why does the IESO assume that the expected forced outage rate is zero? For each column and each year, please state the impact in MW of the expected forced outage rate on Pickering's available capacity at the time of the system peak.
- 2. With respect to the response to (d), please also quantify the impact of Pickering's extended operation on imports & exports for each year (another form of avoided generation).
- 3. With respect to sub-question (e), the IESO has misinterpreted ED's question. ED is not seeking Pickering's actual forced outage rate in 2014, but rather the forced outage rates that the IESO assumed for Pickering when forecasting how much of its capacity would be available at the time of Ontario's system peak for each year of its analysis. Please ask the IESO to provide this information.

4. With respect to the response to (h) and (i), has the IESO done any analysis to verify the reasonableness of these numbers? If not, why not? If yes, please elaborate and provide a copy of that analysis.

ED Interrogatory #29

1. With respect to response (b), for each year please state how much of the difference in MWs between Pickering's "installed" and "available capacity" is due to expected forced outages.
2. Part (d) requested the avoided generation that the IESO estimates would be caused by Pickering operating to 2022/2024. The IESO stated as follows: "Not applicable, as the simulation run of Pickering operates to 2020 is not available." This response does not explain why a response could not be calculated or provided. Please provide a response to that part of the interrogatory.
3. Part (e) requested the IESO's *current* forecast of the Pickering forced outage rate from 2016 to 2024. The reference provided in response does not include that information. Please provide the requested information.
4. No response was provided to part (f). Please provide a response.
5. No response was provided to part (l). Please provide a response. This is relevant. If Ontario's incremental peaking requirements, assuming Pickering is not extended, have changed, then this will impact the economics of the proposed Pickering extension. Whether or not a Pickering simulation is available, the IESO will have up-to-date estimates of our incremental capacity requirements if Pickering is not extended.
6. No response was provided to part (m). Please provide a response. The IESO analysis has assumed that the cost of the replacement capacity is equal to the cost of building new gas-fired peaker plants. But it is highly relevant to know if there are lower cost options to meet our capacity needs.
7. The last line of the interrogatory asked that the IESO "please state your methodology for calculating Pickering's available capacity (MW) at the time of Ontario's peak demand." No response was provided to this part of the interrogatory. Please provide a response.

ED Interrogatory #30

This interrogatory requested that the IESO recalculate its cost-benefit analysis of Pickering Extended Operations based on its best *current* estimates of the key variables listed in the interrogatory. The IESO stated that it has not updated its assessment. That is not a justification for not doing so. The requested information is highly relevant. We ask that the requested information be provided.

ED Interrogatory #33

This interrogatory requested a comparison of Pickering Extended Operations versus a shutdown in August 31, 2018. No response was provided. Please provide a response.

August 31, 2018 is a highly relevant date for comparison purposes. Pickering cannot be shut down before that date, which is when the Clarington Transformer Station will be built. But after that date, Pickering is just one of a number of options to meet Ontario's electricity supply. At

that point, OPG should not be paid more for the power from Pickering than the cheapest alternative, which could be considered to be the “market rate.” After that date it is important to know what the lowest cost alternative is. Environmental Defence would argue that OPG should not be paid any more than the lowest cost alternative.

ED Interrogatory #34

1. With respect to the numbers in Section T4 for the years 2021 to 2024 inclusive: please provide for each year the IESO’s estimate of: a) Pickering’s installed capacity; and b) available capacity at the summer peak. Please describe the IESO’s methodology and show its calculations for calculating the difference between installed and available capacity.
2. With respect to the load forecasts shown in Section T3: are any of them consistent with the IESO’s MARS program? If no, please provide the MARS load forecasts for these years. [Note: The IESO uses General Electric’s Multi-Area Reliability Simulation (MARS) program to derive its load forecast to estimate its reserve margin requirements. See IESO, *Ontario Reserve Margin Requirements 2016 – 2020: Issue 1.0* (December 21, 2015).]
3. Please provide a response to part (b). The IESO outlined a methodology but did not provide an answer.

ED Interrogatory #35

Please answer this interrogatory. The IESO states that its contingency planning is still ongoing, but that is not a reason for not providing its best possible answers to our questions now.

ED Interrogatory #36

With respect to Table 1, were any “decrements” made to take into account the expected forced outage rates for Darlington and Pickering? If yes, please provide the MW adjustments for each station for each year.

If no forced outage rate adjustments are made, please reconcile this fact with their *Ontario Reserve Margin Requirements: 2016 – 2020* report which states: “Equivalent forced outage rates (EFOR) of existing units are derived based on analysis of a rolling five-year history of actual forced outage data.” [p. 10]

ED Interrogatory #38

Please provide a copy of the electricity agreement with the Government of Quebec as requested. The IESO provided a link to a news release, not the agreement as requested.

ED Interrogatory #39

This interrogatory requested a comparison of the net benefits of continuing to operate Pickering until 2022/2024 versus a Pickering shutdown in August 31, 2018, with replacement power to come from a combination of the lowest cost options including the maximum possible electricity imports from Quebec. This was not done. The IESO stated that hydro power from Quebec cannot

fully replace Pickering and that the IESO's analysis is already based on "the next least-cost alternative." However, the IESO's analysis is based on obtaining all the power from one source – gas fired generation, rather than a combination of lowest cost sources including increased power imports. Please provide a response based on a combination of the lower cost sources.

Please also assume that replacement electricity is not needed to replace electricity that would be exported (i.e. replacement power is only required to meet Ontario's actual needs).